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Contents

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★

Distributed monthly to finishing room and paint shop foremen, production superintendents, chemists, purchasing agents and company executives of metal-working, woodworking and miscellaneous industrial plants where production cleaning and finishing are major operations in parts and products manufacture.

★

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24 TWENTY-FOURTH YEAR OF PUBLICATION

Industrial Census is promised this year by the Department of Commerce's bureau of the census. It is estimated it will cover the activities of 250,000 industrial establishments. The last census in 1939 covered a total of 184,230 firms. The purpose of the present counting is to reflect the changes that have taken place in nine hectic years of exceptional activity. The results should prove interesting. Industrially speaking, in 1939, New York ranked first, Pennsylvania second and Illinois third.

A comprehensive census will prove invaluable to all business and for National defense purposes, should it become necessary.

* * *

Metallic Lacquer. A distinct contribution to the finishing industry has been made by E. I. du Pont de Nemours & Co. in granting free licenses to 50 paint and lacquer companies to manufacture and sell a new metallic finish. It is to be marketed as "Duco" metallic-chrome lacquer.

* * *

More Aluminum to be used in automobiles was predicted at a recent meeting of the Society of Automotive Engineers. It is said that one pound of aluminum used in car manufacture will release almost three pounds of steel. Engineers admit that the lighter metal will produce many new production and fabricating problems. Present production of aluminum can not be expected to absorb the entire shortage of steel, but if used for hoods, doors, gasoline tanks, instrument panels, transmission covers and hub caps, it will aid in producing more motor cars, perceptibly reduced in weight.

* * *

Fluorescent Pigments soluble in water, lacquer or enamel are available. When applied on any material they give unusual brilliance in daylight, even in clouded light, and produce an exceptional color effect under black light.

For the especially-hard-to-see job, for murals, or wherever unusually attractive brilliance is required, fluorescent color seems to be the answer.

* * *

A New Blue Dye, said to be colorfast, was shown publicly for the first time at the British Industries Fair in London and Birmingham May 3 to 14. It will provide textile printers with a turquoise blue that is really fast to both light and washing. A new plant will be erected in England to manufacture the dye for world wide distribution.

* * *

Retail Advertising is due for a "new look" according to H. P. Abraham, manager of the sales promotion division of the National Retail Dry Goods Association. At a meeting of the Advertising Federation of America, Mr. Abraham gave these statistics: By including four major merchandising facts in a series of newspaper ads, it produced 50.5% success. When eight or more merchandising facts

M&E *scores again!*

WITH THE *"Thermatic"* SPRAY PAINTING UNIT

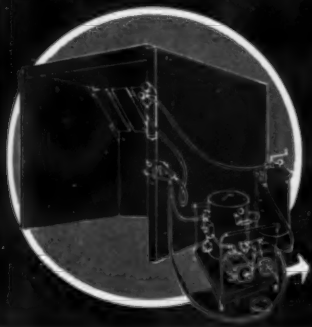
FOR APPLYING HIGH SOLID CONTENT LACQUERS AND SYNTHETICS AT ELEVATED TEMPERATURES

The M&E THERMATIC Spray Painting Unit is the most outstanding of its kind ever designed . . . the result of years of careful study, research and actual production work in the field.

One Coat Finish

- CUTS SPRAYING TIME
- SAVES MATERIAL
- ELIMINATES BLUSHING AND BLOOMING TROUBLES
- CUTS REJECTIONS

The THERMATIC Spray Unit heats the material being sprayed to the proper temperature required and maintains constant circulation of the material for perfect finishing results. When sprayed hot, material levels out to a smoother, more uniform finish equal to two or more coats by ordinary methods, since a greater film thickness can be applied without danger of sagging. Fully dependable and fool-proof, with every conceivable safety factor BUILT-IN.



CONSTANT CIRCULATION

Assures minimum temperature drop at the Spray Gun and prevents overheating of the material being sprayed.

EXPLOSION PROOF

All electrical equipment is explosion proof and fully approved by Underwriter's Laboratories and Fire Insurance Underwriters.

FULLY AUTOMATIC

Temperature range is adjustable from 100° to 200° Fahrenheit and automatically maintains the desired temperature.

The THERMATIC Spray Painting Unit can be adapted to any standard spray finishing system as illustrated. Easy to install . . . Simple to operate.

WRITE FOR COMPLETE INFORMATION NOW!

"ALWAYS IN STEP WITH THE FORWARD STRIDES OF THE FINISHING INDUSTRY"

M&E MANUFACTURING COMPANY

Engineers • PAINT SPRAY FINISHING SYSTEMS • Designers

INDIANAPOLIS 5, INDIANA

COMPLETE
SPRAY BOOTH
ENGINEERED
MAINTENANCE

Whether you have wet spray booths or dry . . . DU BOIS can save you long hours of maintenance labor and assure you of peak performance and top production. DU BOIS ENGINEERED SERVICE gives the closest approach to perfection in the operation and maintenance of spray booths.

FILMITE PIGMENTED OR CLEAR

A protective coating that prevents paint overspray from sticking to dry areas of paint spray booths. Simply spray or brush on. For clean-up, peel off or wash off

KLARIFIANT

Twin action water wash compound for spray booth water curtains.
Eliminates:
1. Plugged nozzles.
2. Water breaks.
3. Clogged lines and pumps.
4 Sludge in reservoir
5. Loss of pressure

FERRO-TERJ

For periodic cleaning of wet spray booths. Cuts deposits from tank, water fall sheet, pump lines and nozzles, quickly, cleanly, safely for periodic purging.

Let DU BOIS take spray booth "headaches" from you. Hundreds of plants have eliminated their booth problems with DU BOIS. Convince yourself by writing for complete information.

Address: Industrial Division

The Du Bois Company
3120 WEST FRONT STREET
CINCINNATI 3, OHIO

REPRESENTATIVES EVERYWHERE
WAREHOUSES IN PRINCIPAL CITIES

were used, effectiveness increased to 64.1% success. In a direct mail test, the addition of a few factual words brought 40% more sales. The truth is that retail or otherwise, people like to be given real facts.

* * *

A Light Fixture, said to be fireproof and to resist shock, has been developed. It is made of plastic-glass and aluminum. The fixtures, made for both incandescent and fluorescent lamps were developed for tests on the Navy's fighting ships. It is said they will withstand a 2,000-footpound shock, and when enveloped in fire, produces chiefly nitrogent, an inert gas which has a tendency to smother flames.

* * *

Shortage Of Conveyor Belts is claimed by a large Akron producer. Twice as many conveyor belts are being produced now as in 1940. Still there is a seven months' backlog of orders. Shortage is expected to continue for at least a year.

It all goes to show that industry is alert and forward looking. More people are discovering that it costs money to "pick it up and lay it down," and no one can let it stand still.

* * *

Equipment Obsolete. At a recent meeting of the American Society of Tool Engineers in Cleveland it was reported that the tools and mass production methods which played so large a part in winning the last war are obsolete. The scene changes fast. Improved equipment and methods quickly supplant the old.

What about the finishing room; the finishing system? What about the new finishing materials now available? What about the use of hot synthetics? What about improved handling of materials and work in process? *(Continued on page 110)*

GEORGE KOCH SONS, INC.

KOCH STANDARDIZED TRUCK-TYPE BAKING OVENS

- Can be furnished in standard single unit or any multiples thereof.
- Much lower initial investment for you, because of standardized construction.
- Faster delivery. You get these standard truck-type ovens right off our assembly line.
- You can know your costs accurately in advance. These standard units carry a standard price.
- Complete and ready to operate. All accessory equipment is included.
- Dependable. Proved in service over many years by many of the country's leading manufacturers.

In addition to ovens and other specialized equipment, we design, build and install *complete* finishing systems to your individual requirements. *Write for Circular A-4.*

GEORGE KOCH SONS, INC.
EVANSVILLE 4, INDIANA

COMPLETE FINISHING SYSTEMS

View in finishing room of The Rudolph Wurlitzer Co., showing an operator spraying a piano with high-solids lacquer, which is thinned to easy spraying viscosity by passing from the pressure tank through the heating coils of a "hot lacquer unit" designed and built especially for this purpose. Photo, courtesy of M. & E. Mfg. Co.

High Solids *Lacquers*

WHEN THE first low-viscosity lacquers appeared on the industrial scene, in the early twenties, they quickly became popular with the metal-finishing industries because of their phenomenal drying speed, print resistance, color retention and ease of patching. The same factors appealed to the woodworking industries, and gradually the old varnish schedules were replaced, in great measure, by this new finish.

There were some objections to lacquer finishes. They did not flow as well as varnish, and the resulting orange-peel effect required more rubbing. The odor of lacquer solvents was unfamiliar to most finishers and was therefore a cause of resistance to their use. The original wood fillers were not quite suitable for this new finish, and some time was required to adapt suitable fillers to it.

By S. P. WILSON, Ph. D.

The chief objection to early lacquers was the great difference in solid content between varnishes at from 35% to 50%, and lacquers at about 20% solid content. Lacquer coatings were thinner, required more applications, showed less depth and brilliance, and were more expensive. On

the other hand, repairs and rejects were greatly reduced by their use, since their fast set-up and drying time diminished the pick-up of lint and dirt; the hardness of film reduced "printing" troubles; and the necessary extra coats could be sprayed on so rapidly that there was still a real over-all saving in the production time. However, even though lacquers have steadily increased their share of the wood-finishing business over the past 20 years, there has been a continual demand for increased solids in lacquers, and much research has been devoted to this problem.

Difference in Solids Content—Lacquer Versus Varnish

The reason why a varnish at 50% solids can be applied easily, while a lacquer at 25% solids is viscous and difficult to spray, can be simply explained. In a varnish, the resins and oils are cooked together, but are not fully converted to a dry film. They are left in a low molecular weight condition. After application and evaporation of solvent there is a combined action of oxygen in the air, accelerated by driers in the varnish, plus internal polymerization of the unsaturated compounds in the varnish, that eventually results in the formation of a tough, high-molecular weight film. Since viscosity is usually a function of molecular complexity, it can be seen that varnish can be applied in low-molecular—therefore less viscous—condition and reaches its tough and hard condition after application is completed.

In the case of lacquers or other solvent-release types of finishes, the conditions are quite different. Here the necessary formation of the high-molecular weight compounds required to give tough films is done before the material is applied. The nitrocellulose and ethyl cellulose that are basic in lacquer formation are made from the highly complex cellulose molecule, and give comparatively viscous solutions. The alkyd resins, both of the phthalic and maleic types that are so widely used in conjunction with them for making wood lacquers, are synthetic materials that are also intrinsically viscous. We therefore secure material that is very thick at equivalent concentrations, when compared with varnish type finishes, and under ordinary conditions it cannot be applied at anywhere near the same concentration.

Pre-war wood lacquers were usually sprayed at under 27% solids—from 21% to 24% being the general average. Since the nitrocellulose portion accounted for most of the viscosity, attempts were made to lower, this and increase the resin content, but there was danger therein of losing print-proofness, cold check resistance and scratch resistance, while gaining a small apparent advantage in fullness.

Research and Development Have Improved Modern Lacquers

Research to improve the concentration of solids in lacquers at spraying viscosity has been carried on from several points of attack. First, of

Early lacquers suitable for spraying were of low solid content, therefore several coats were required to build up a protective film of reasonable thickness, but laboratory developments and improvements have resulted in new high-solids content lacquers which give considerable more "material build" in a single spray coating.

course, work was done to reduce the viscosity of nitrocellulose so that more could be incorporated in a lacquer at a desired viscosity. The modern lacquer industry was founded on the introduction of the so-called ½-second nitrocellulose instead of the previous 20 seconds, and higher viscosity types.

It may be well to mention here the meaning of the expression "x seconds viscosity". This is based on the fact that, within certain limits, an object sinks in a liquid at a rate inversely proportional to the viscosity of the liquid. In the lacquer industry a steel ball of fixed weight and diameter is allowed to fall through 10-in. of a solution made of definite concentration of nitrocellulose in a definite solvent mixture, at a fixed temperature. If it requires ½-second, that is the label given to that batch of nitrocellulose. If it takes 5 or 50 seconds, these respective figures are used to describe the material as to viscosity. Up to recently the lowest viscosity commercially used was ¼-second, while the highest was in the neighborhood of 3000 seconds.

Recently a material of lower viscosity than the ¼-second type has been developed. Since under the previously described system this would be a very small odd fraction, it is described as being 30 to 35 centipoise type, the centipoise being an absolute unit of viscosity defined by a formula in physics. This type permits of loading from 20% to 25% more nitrocellulose into a formula than the previously used viscosities would allow and this, in turn, permits the addition of more resin and plasticiser.

Work has also been done on the problem of reducing the viscosities of these adjuncts to the nitrocellulose portions, and both maleic and phthalic alkyd types of resins have been developed that are less viscous than their predecessors, while still retaining the durability and cold-check resistance required for good lacquers. In this work some resins have been made that permit a higher ratio of resin to nitrocellulose than was previously consistent with good performance, so here too is a possibility of increased total solids in the formula.

Stronger Solvent Combinations For Use in Lacquers

So far I have discussed only the question of viscosity of the film-forming portion of the formula. Another approach to increased solids lies in the use of stronger solvent combinations. This possibility has also been explored quite thoroughly. In the usual type of wood lacquer, a product that is in the most highly competitive price class, emphasis in formation has been placed on the leanest solvent mixtures that would get by.

True lacquer solvents, such as the esters and ketones, are considerably more expensive than diluents such as toluol and naphtha, therefore the tendency has been to load the formula with these diluents, so as to keep the cost of the formula competitive. By doing this, the viscosity for a given concentration has been kept higher than possible if a richer, but more expensive, solvent mixture were employed. In the newer formulations, where maximum solids are desired, much richer solvent formulas are used. This is logically needed for another reason; as solids increase, the total solvent mixture decreases and should, of necessity, be richer to overcome the smaller percentage.

By using the low-viscosity film-forming agents, and solvents rich in esters and ketones, it is now possible to bring up the solids of wood lacquers to an appreciable degree. High grade formulations that can be applied at ordinary temperatures and with ordinary spray equipment and technique are available at from 30% to 35% solids—approximately 50% greater than the previous average concentration. *(To page 36)*

Do You want to

IMPROVE YOUR SPRAY PAINTING?

. . . BEDE PRODUCTS, Inc., offers to the trade a Revolutionary . . .

Complete THERMAL CONTROL *System*

(PAT. PENDING ON PROCESS)

Now, with the complete THERMAL CONTROL System, the temperature of PAINT, ATOMIZING AIR and PRODUCT SURFACE can be independently controlled, each to its ideal elevated temperature.

HEAT is harnessed to do a better spray painting job—resulting in a whole series of benefits. The Bede Thermal Control System does not merely level off daily and seasonal fluctuations of temperature, it also creates temperature conditions much more favorable than ever encountered on the hottest summer day.

This system is applicable to all types of organic finishes. No matter what nature of finishing, there is an ideal temperature. The Bede System perfectly heat conditions paint, air and surface to obtain spraying results never before attained. Below is a typical example of temperature constantly maintained by the BEDE THERMAL CONTROL SYSTEM.

Paint, 160°F. At the Gun

Air, 115°F. At the Gun

Product, 100°F. At Product Surface

PERFECT SPRAYING TEMPERATURES

For greater economy and savings on:

- LABOR and MATERIAL
- INCREASED QUALITY and SALES
- INCREASED PRODUCTION

Results . .

Write for Descriptive Bulletin

BEDE PRODUCTS Inc.

INDUSTRIAL FINISHING SPECIALTIES

3309 WEST 118th STREET • CLEVELAND 11, OHIO

These lacquers spray easily and dry to smooth films. However, since the film deposited is thicker than that which the previous type of lacquer lays on the work, the drying time for rubbing, polishing and packing is somewhat longer. The value of this type of formulation is greatest for topcoats, and least for sealers. The latter are usually best applied at lower solids and, since they are generally sanded fairly close to the wood, the use of a more expensive, higher-solids, slower-drying type contradicts the desired qualities.

A schedule that has been very successful on mass production of radio cabinets consists of a coat of sealer of 18% to 20% solids, which is sanded, followed by a coat of conventional-type lacquer of 23% to 25% solids content, and topped off by a coat of 30% to 33% high-solids, rubbed-effect lacquer. This leaves enough film for the purpose, without using two coats of the more expensive lacquer—while only two coats of the lower-solids materials would be a bit skimpy.

Thinning High Solids Lacquer With Heat

It is possible to increase still further the solids available at spraying viscosity by the use of heat. Lacquer is reduced in viscosity by heat as well as by thinner, and apparatus has been developed whereby it can be safely brought up to 160° to 180° F. At this temperature a conventional lacquer can be sprayed at 30% solids or higher, while by using heat in conjunction with the other developments it is possible to reach close to the 40% mark. Here too, it is essential to maintain a high-grade solvent mixture, rich in active solvent and of fairly high boiling-point.

Lean and low-boiling mixtures will tend to give too much spray dust. As a rough approximation to average conditions, a lacquer that normally requires 100% reduction to spray at room temperature, can be applied at 180° F. at a reduction of only 50%. The saving in solvent required to convey a given amount of solids is apparent, as is the reduced labor and overhead costs due to the fewer coats required.

It is thus now possible to come considerably closer to the solid content of varnishes with lacquers that retain the outstanding virtues of this type of finish. They are now in use, and their use will undoubtedly spread.

Glidden Co.'s San Francisco Plant Completed

Completion of a $300,000 expansion program at the San Francisco plant of the Glidden Co. is announced by E. L. Ehrke, regional director. The new Glidden facilities include a plant designed for manufacture of alkyd resins and for varnish and oil processing. New equipment will capitalize on the first important changes in varnish production in more than 50 years. Varnish formerly produced in 100-gallon to 350-gallon lots now will be made in quantities up to 2000 gallons.

One of the most important improvements is the elimination of open-fire varnish production. New units will "cook" the varnish by indirect heating, with a great increase in employee safety.

The Glidden executive stressed the improvements that alkyd resins and other synthetic resins have brought in paint and varnish production. These materials, he said, impart greater durability and superior color and gloss retention to enamels of all kinds.

Output of the new alkyd resin facilities will be used almost entirely for increased production of Glidden paints.

The San Francisco work is part of a $1,000,000 expansion and modernization program which also involves major Glidden paint plants at Cleveland, Reading, Penna., and Minneapolis.

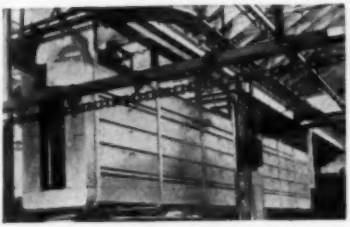
Cowles Detergent Co. Announces Fine New Plant

The Cowles Detergent Co., Cleveland, Ohio, announces the completion of a new million dollar plant at Skaneateles Falls, N. Y. One of the most modern chemical plants in the country, it is equipped with up-to-date technological equipment for the manufacture, packaging and shipping of the Cowles line of heavy chemical detergent silicates as well as the Company's line of specialized detergents for metal cleaning and other fields.

FIRST IN A SERIES of advertisements on Short Cycle Heating which point the way to easier, faster and lower cost heating for many industrial processes

SHORT CYCLE HEATING

Has It a Place In Your Business?



Do you process metal, plastic, paper, ceramic, textile or leather products? If so, undoubtedly you have one or more applications for baking decorative finishes, drying surface coatings or adhesives, evaporating moisture, preheating or curing some chemical product. Virtually all of these processes are readily adapted to SHORT CYCLE ELECTRIC HEATING, yet ovens and driers remain among industry's most time- and space-consuming devices.

Long heating cycles (20 minutes to as much as four hours) are the outgrowth of outdated oxidizing processes, or use of convection ovens where slow heat transfer, air circulation, and necessity for indirect control methods have prevented reliable short cycle results.

"Short Cycle Electric Heating" is different. It immerses the products to be heated in a combination of convection and high density (infrared) radiation. The heating job is accomplished faster (in periods ranging from seconds to seldom more than fifteen minutes), better and at lower cost.

Trumbull has developed SHORT CYCLE ELECTRIC HEATING for industry under the exclusive trade name RAYMERSION. Raymersion Ovens are prefabricated, for assembly "on location" from standard insulated sections, to provide "made to measure heating" . . . heating that pays dividends in speed, space-saving and product control.

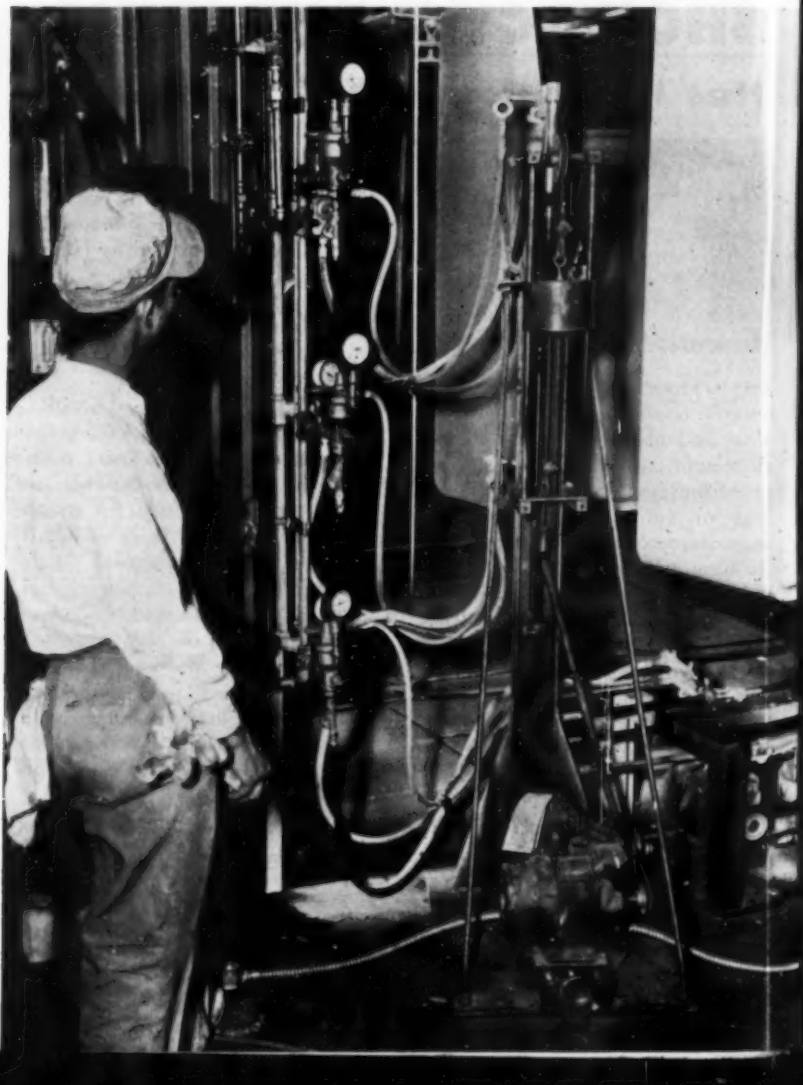
Be ready for your next low temperature heating application (200-500 F) with a Trumbull Raymersion Oven. Write for new bulletin, "The Ten Stepping Stones to Successful Short Cycle Heating".

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Connecticut; Norwood, Ohio.

TRUMBULL (T) ELECTRIC

Painting REFRIGERATORS

Photographs, courtesy of Ransburg Electric-Coating Corporation, Indianapolis, Indiana.



Electrostatically

Doors and cabinets for Norge refrigerators are automatically spray painted at low pressure, as they move by chain conveyor through a safely controlled electrostatic field wherein a fog of finely atomized paint spreads over exposed curved surfaces and around the edges to produce a coating of uniform thickness.

By G. P. KENNEDY*

SEVERAL months ago the Norge Division of Borg-Warner Corp., moved its electrostatic spray unit from pilot line operation to the main production line. The electrostatic unit, installed in the Muskegon Heights, Mich., plant, automatically applies the first coat to the outside area of refrigerator cabinets and doors.

First cost records on this conversion indicate that the company will save more than $100,000 a year in paint and labor. Production was increased 45% with less floor space. The spray booth remains remarkably clean for the large volume of work processed, creating real savings in maintenance costs. Added economies, due to lower ventilation requirements, have been realized too.

Cabinets and Doors Are Automatically Sprayed

Refrigerator cabinets and doors are carried through the spray booth by an overhead chain conveyor. Two cabinets (one to a hanger) on 48-in. centers are followed by a work holder ingeniously designed to hold two sets of provision and machine compartment doors. This permits the alternate painting of cabinets and doors in a way that best lends itself to subsequent assembling operations. No change or adjustment in the automatic spray equipment is required to coat both doors and cabinets. Cabinets are inverted to preclude dust settling on their tops during the baking of the paint coating. The backs of the cabinets are not coated in the first painting operation, as this area is largely covered by the "flue" which is subsequently attached.

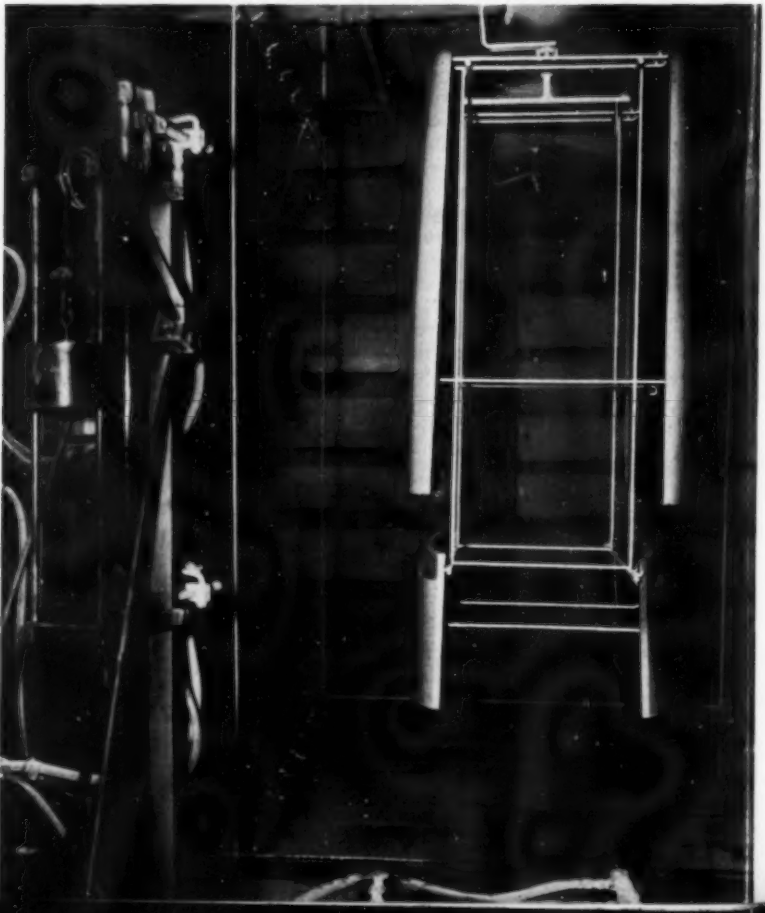
Spaced 12-in. from the surfaces being painted is the high voltage grid which creates the electrostatic field of attraction between it and the electrically grounded parts. Among the special controls is a new development, the "Electronic Spark Guard", which turns the equipment off in case of any breakdown in in-

*Resident Manager, Norge Division, Borg-Warner Corp., Muskegon Heights, Mich.

sulation or in case a part should inadvertently get so close to the voltage grid as to cause a spark. This device actually turns off the power before the spark occurs and thus adds considerably to the safety of the operation.

This entire painting operation is accomplished with only seven automatic spray guns in one pass through the single booth, replacing six hand spray men. The spray guns operate at low pressure which is characteristic of the electrostatic process—2-lbs. per square inch fluid pressure, and 18-lbs. per square inch atomizing air pressure. By moving the spray guns automatic-

Close-up of the spray booth shows arrangement of the 3-sided Ransburg electrode system. Doors are hung so they are in same relative position as they will be on the cabinets



a good thing to remember about metal-cleaning

NO MATTER what your cleaning problem may be—from the simple unpeeling of a thin film of slushing oil to the difficult removal of buffing compound residues and other burned-on mixtures of oil or grease with solid-particle dirt—there is an Oakite cleaning material designed for just that job.

COUNTLESS COMBINATIONS. The twenty types of metals and alloys in common industrial use, the dozen or more fabricating processes, the two dozen finishing processes and the countless varieties of dirts that adhere to metals, have made metal-cleaning a complicated business.

NEW PROBLEMS—RIGHT ANSWERS. But the chemists and engineers of the Oakite Chemical Research Laboratory and the Oakite Technical Service Department—with nearly 40 years of experience in metal-cleaning—are always able to work out a right answer for a new problem. Best of all, they are represented in your neighborhood by a man whose skill can bring the Oakite laboratory into your plant.

FREE OAKITE SERVICE. For the right answer to that tough metal-cleaning problem, consult your Oakite Technical Service Representative. Let him help you work out a procedure that will produce best results at lowest cost. Write today to Oakite Products, Inc., 20 Thames Street, New York 6, New York.

OAKITE

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Specialized Industrial Cleaning

MATERIALS • METHODS • SERVICE

ally up and down the sides, and back and forth across the inverted top, a uniform paint film is deposited. This goes a long way toward elimination of paint rejects.

Hand spraying is employed for coating the inside of the machine compartment doors, and the inside of the machine compartment itself, since these areas are shielded from electrostatic deposition. Two men do this hand spraying, although it is anticipated that later only one man will be needed.

One of the remarkable features of electrostatic spraying is the so-called "wrap-around" that is inherent with this process. Electrostatic attraction causes the paint to deposit as heavily on the edges facing away from the spray direction as it does on surfaces that face the direction of spraying. Part of this accomplishment is due to the manner in which the spray guns are turned off and on between parts.

At present, the length of time that the guns are operating is exactly the same for the doors 30-in in width (and wider on large models) as for the 19-in. width on the sides of the cabinets. Norge engineers are now engaged in the installation of a switching arrangement which will permit individualizing the gun cut-off for the doors and cabinets. It is anticipated that this will save an additional 10% or 15% in paint consumption.

Another helpful factor provided by the "wrap around" feature is the full coating that is deposited on all edges. With previous hand spraying, the satisfactory coating of the edges was an expensive operation in both paint and labor, and if the edges were not properly coated, there was a possibility of rust starting there and creeping onto exposed surfaces.

This new application of the modern electro-coating processes is making history at Norge by providing more benefits than any other single post-war improvement made in the manufacturing facilities.

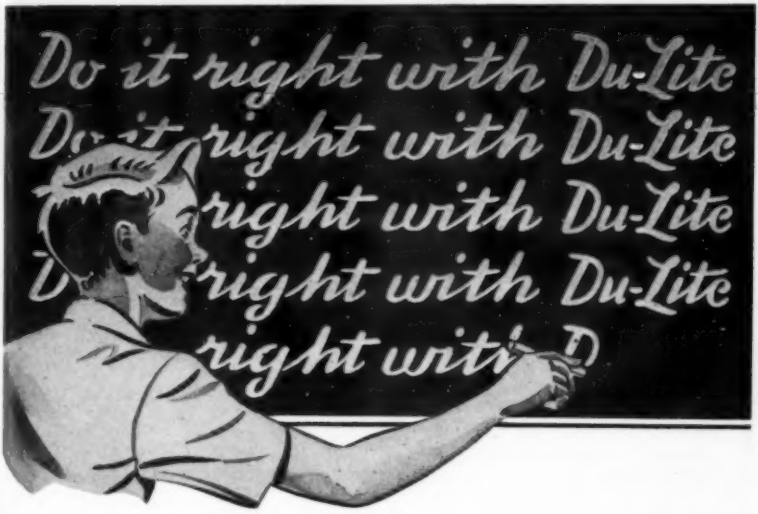
FOR CLEAN ENAMELING. I had occasion to visit the Oran Co., Columbus, Ohio, and was very much impressed by the spotlessly clean surroundings throughout the plant—which is well equipped to do any type of industrial spray painting where quality is of prime importance.

Large cleaning and Bonderizing tanks give the metal proper and necessary surface preparation. The next step is through the three spray booths, which are 14-ft. water wash booths.

After leaving the spray booth the parts travel on overhead conveyors through the radiant heating units and are removed, after baking and cooling, for packing or assembling.

Mr. H. W. Kelly, General Manager, has a solution to the problem of producing clean jobs, and I would like to pass on a suggestion, in the form of a tip, from Mr. Kelly who told me how he does it.

Wash down the walls and sash, as well as the floors, with a running stream of water, and do it often. This method of plant cleanliness is often overlooked and if the suggestion is worth a trial, I am confident it will pay dividends in smooth, clean, enameled surfaces, and less fire hazard. Mr. Kelly is also installing a new air-filtering system.—A. P. LEHMANN.



Du-Lite the Dependable Black Finish for Steel...

When your production problem calls for a fine, uniform black finish for steel parts, an oil-absorptive, rust-resistant, anti-friction finish; a finish imposed at non-critical temperatures as an integral part of the surface itself without any change in the dimensional or reactive characteristics—you will find your answer in the DU-LITE PROCESS.

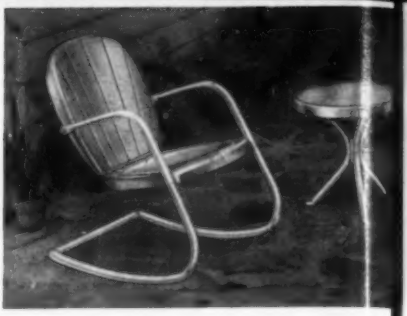
DU-LITE has solved black finishing problems for a host of satisfied clients whose products meet exacting requirements in good appearance, long service, dependable protection and smooth operation.

A DU-LITE field engineer will gladly consult with you on your problem and prepare samples of your work finished in DU-LITE. He will demonstrate to you how you can install this simple, proven process in a small, convenient spot in your plant and operate it with your own personnel. Write for descriptive literature.

THE *Du-Lite* CHEMICAL CORPORATION

140 River Road . . . Middletown, Conn.

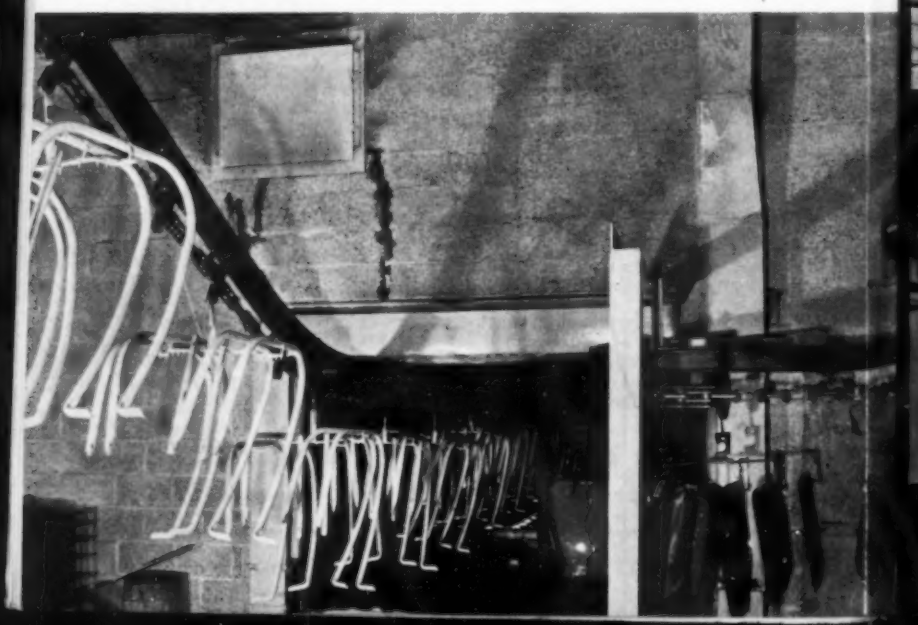
CLEANING, RUSTPROOFING and PAINTING



Parts for Outdoor

PARTS FOR the Arvin line of metal outdoor chairs and other furniture manufactured in a Noblitt-Sparks plant at Columbus, Ind., now are being rust-proofed and prepared for paint finishing by a simple, room-temperature process involving a "per-chair" cost for rust-proofing material of less than ⅓ cent. This figure, when

Furniture parts, traveling different routes from paint room, are reunited as they enter oven.



This conveyorized setup includes cleaning with a hot alkaline spray, a cold water rinse, spraying with a rustproofing solution, a cold water rinse, a hot chromic acid rinse, drying in an oven, cooling, dip coating, baking the color enamel finish and packing.

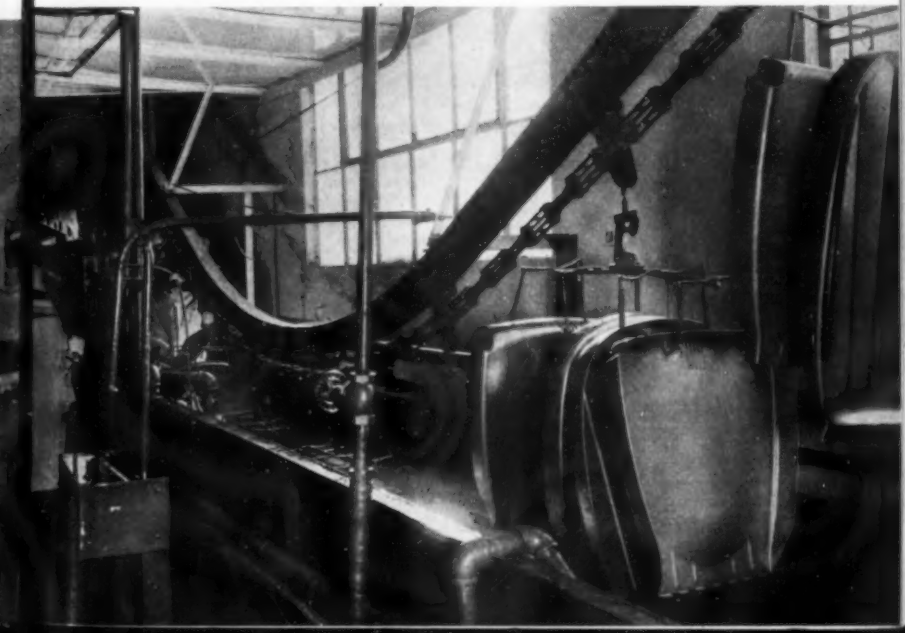
Metal Furniture

converted to metal surface area, is less than $0.17 per 1000-sq. ft.

Despite this low unit cost, salt spray and humidity cabinet tests of furniture specimens indicate excellent paint adherence, as well as corrosion resistance.

Because heat is not required in applying a solution of Banox, the newly developed chemical, Noblitt-

Chair seats and backs descend into paint tank and emerge at far end completely coated.



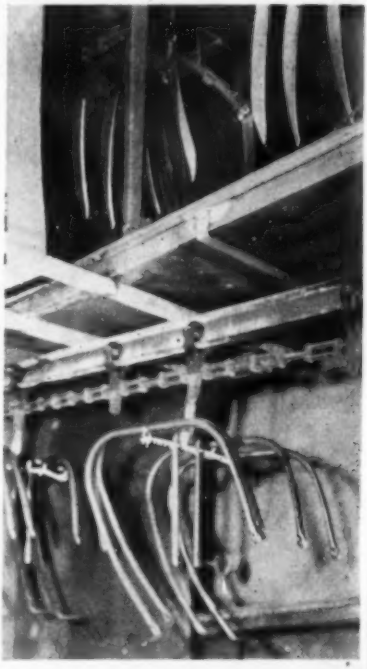
Sparks has been able to incorporate its use as an integral step in the new U-shaped spray-type wash tunnel. Through this tunnel, which is of the firm's own design, the tubular steel frames and sheet metal backs and seats of the furniture are moved on a double-deck conveyor line.

With the rust-proofing thus simplified and coordinated with other manufacturing steps the outdoor furniture plant now is set up to run through large volumes of parts without manual handling—from the time the parts leave the presses and are suspended on the conveyors, to their arrival at the packaging stations.

Laboratory workers report that the coating results when Banox is applied—whether by spray or immersion methods—is an amorphous or non-crystalline phosphate. The physical structure of the Banox film is similar to that of the high-polymer resins used in paint.

The Banox coating follows the profile or contour of the metal surface, whether smooth or rough, in an even and continuous film approximately 15 millionths of an inch in thickness. Since the rust-proofing coating does not impart "roughness" to the surface, high-gloss finishing with minimum paint film thickness is possible. The rust-proofing coating is flexible and does not crack or flake when the metal it covers is formed or impacted.

The Noblitt-Sparks outdoor furniture plant is described by visiting engineers and production men as one of the most modern in point of equipment, organization and operation in the metal fabricating industry. A step-by-step review of its procedures reveals several innovations or improvements.



The double-deck conveyor system moves the chair frames (below) and sheet steel backs and seats (above) into the spray-type wash tunnel, where cleaning, a cold rinse, a spray with rustproofing solution at room temperature, another cold rinse and a hot chromic acid rinse are successively given.

Forming Tubes of Cleaned Metal Strips

First principal step in production of the Arvin line of metal furniture is the fabrication of tubing for frames. Hot-rolled pickled 16-gage steel strip is formed into cylindrical shape on progressive forming

The New BLACK MAGIC *Zinc Black*

Protects Important Parts

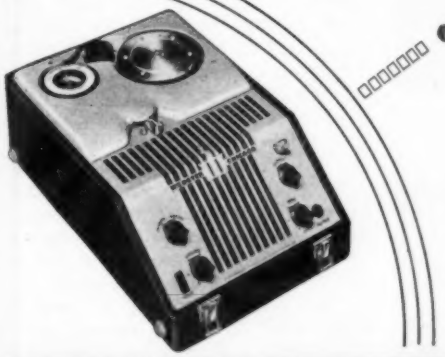
ON THE WEBSTER-CHICAGO WIRE RECORDER

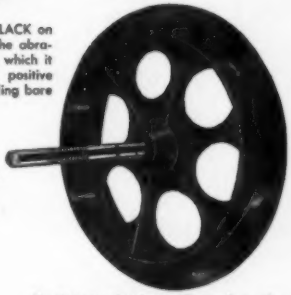
Black-Magic ZINC BLACK is used on the spool of the Webster-Chicago Wire Recorder shown below because it does not build up the diameter and is a good bond for the silk screen painted trade name.

Black-Magic ZINC BLACK on the mandrel resists the abrasion of a felt brake which it engages, affording positive action without revealing bare metal.

Black-Magic ZINC BLACK is the modern treatment for zinc base die castings and zinc fabrications—as an attractive final finish and an effective corrosion and abrasion resistant. It is also an excellent bond for paint, and when so used, it affords full protection for unpainted areas.

Because of these advantages, Black-Magic ZINC BLACK is becoming "standard practice" wherever product sales and service life are important.





Black-Magic ZINC BLACK, used on the take-up reel, resists the abrasion of the magnetic recording wire which rides on the periphery.

Write for the "Black Book" of details on our zinc black and other Black-Magic metal finishes. Also, for a first-hand acquaintance with this zinc black, suggest you send us a product for sample processing without obligation.

MITCHELL-BRADFORD CHEMICAL COMPANY

MODERN METAL FINISHES

• 2446P MAIN ST., (Stratford) BRIDGEPORT, CONN. •

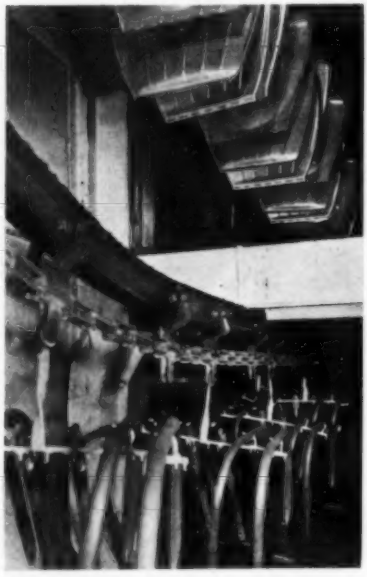
CHICAGO OFFICE: 111 W. Jackson Blvd.

BLACK-MAGIC OXIDE BLACKING SALTS
WITCH-DIP & WITCH-OIL FINAL FINISHES

SILCO *Glass-Base* PROTECTIVE COATING
HEAT TREATING SALTS, CLEANERS, ETC.

rolls of a tube mill, and the seams are joined by continuous electric resistance welding wheel. A roller-type cutter at the mill's end cuts the tubing in the desired lengths for either rocker-type chairs or straight chairs, cocktail tables or other items of the line.

The tubing then is formed into the specified frame shapes on a series of machines, first of which is a hydraulic tube bender equipped with rocker dies. When a frame leaves this department it has been completely formed—its joining ends stab-cut, necked and annealed and bolt holes punched. It then goes onto a rack on the overhead monorail conveyor that thencefort moves it through all succeedin steps—cleaning, rustproofing, rinsing, drying, painting, baking—to final inspection and packaging with other parts for shipment.



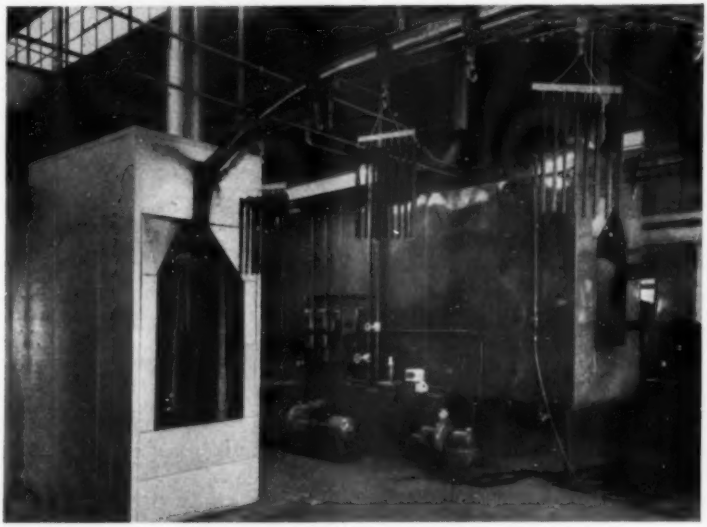
Exit end of drying oven where two conveyor lines carry metal parts, which have been cleaned and rust-proofed for painting.

An interesting innovation of the frame line is in the initial operation, that of tube-forming. Because the steel strip arrives in the plant with a coating of oil, and this film may be trapped inside the tubing and later cause trouble by dripping into the paint tanks, a detergent cleaning operation has been incorporated in the tube mill at the point where the flat strip is fed into the forming rolls.

Chair Backs and Seats Formed and Moved Along

Sheet steel chair backs and seats are blanked, pressed, punched and flanged on a series of presses linked by roller conveyors and gravity chutes. Production on these two lines is synchronized so that a chair seat arrves at the first chain conveyor station at the same time as the chair back. These pieces are suspended alternately on the conveyor racks, and the movement of this conveyor is coordinated with that of the conveyor transporting the tubular steel frames, from this point on through the various operations that lead up to final inspection and packaging.

The frame conveyor is 1462-ft. long, with 548 racks spaced 40-in. apart; the seat and back conveyor is 1372-ft. long, with 514 racks 32-in. apart. The former travels at an average speed of about 18-ft. per minute; the latter about 15½-ft. per minute. The speed of various operations and of the conveyor sys-



A Typical SPRA-CON Installation

ILLUSTRATED is one of the many SPRA-CON Installations of complete finishing systems. Engineered and manufactured to give efficient operation and quality production, SPRA-CON Installations are available for all modern production requirements. *It will pay you to consult with us on your finishing requirements.*

the SPRA-CON COMPANY

Engineers and manufacturers of conveyors, ovens, washers, and equipment for complete paint finishing systems . . . .

1402 No. Western Avenue, Chicago 22, Illinois

tems are coordinated to maintain a production rate of approximately 600 units per hour.

Conveyor Moves Parts Through Washing Tunnel

Thus teamed together as they leave the fabricating department—the furniture frames on the top conveyor at this point and the seats and backs traveling below them, "double-deck" style—the parts then are conveyed into the first operation in the double-deck U-shaped washing tunnel. First comes cleaning with an alkaline spray at 140° F. This is followed by a cold water rinse, and then by spraying from sides, top and bottom with a 1% solution of Banox at room temperature. A second cold water rinse is next, and finally a chromic acid rinse at approximately 150° F.

The conveyors turn, next, from the end of the washing tunnel into the drying oven. When the furniture parts emerge from drying they are ready for the paint tanks. The frames go into white synthetic dipping enamel in a stationary tank; the backs and seats into red or green enamel which is in movable tanks mounted on wheels for interchangeability.

The tank tracks are made of aluminum to reduce the hazard of sparks in this atmosphere. This department also is equipped with a forced air ventilation system and automatic sprinkler heads.

Paint Viscosity Control; Paint Dipping; Baking

An interesting method of controlling paint viscosity in the tanks is employed here. Ducts built onto the tank sides enable workers to circulate cooling water in hot weather, and steam in cold weather, to regulate the paint temperature.

Despite previous inspections, workers in the packaging line guard their company's good reputation for defect-free merchandise by giving the finished parts a last looking-over as they apply colorful Arvin decal labels, and insert the parts in paper covers.

As the furniture parts rise out of the tanks, and for some distance beyond, drain boards catch the excess paint drippings and return them to the tanks. Dip boards underlie the conveyor lines as they swing towards and up to the baking ovens.

The conveyors move the parts side by side through the baking ovens, which are of the infra-red ray type, gas-fired. *(To page 52)*

RANDOLPH

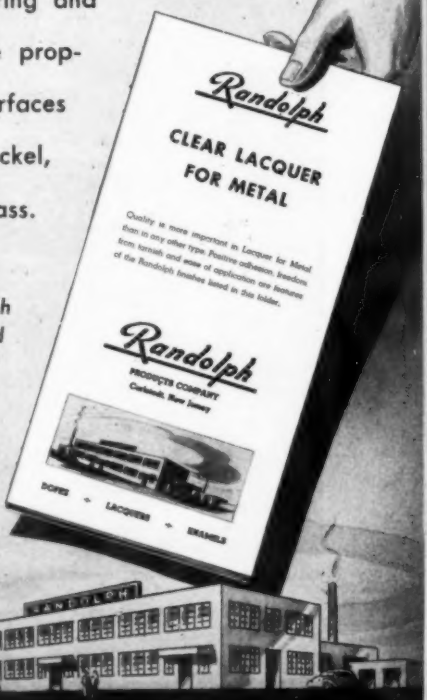
CLEAR LACQUERS FOR METAL

Give full protection and improve appearance

For many years the Randolph organization has specialized in producing fine clear lacquers that will give maximum resistance to moisture, grease, wear, heat, marring and provide positive adhesive properties for difficult metal surfaces such as copper, zinc, nickel, cadmium, aluminum and brass.

●

A copy of our new folder which contains helpful, technical and factual information on all Randolph Clear Lacquers for metal and those for special requirements will be sent on request.

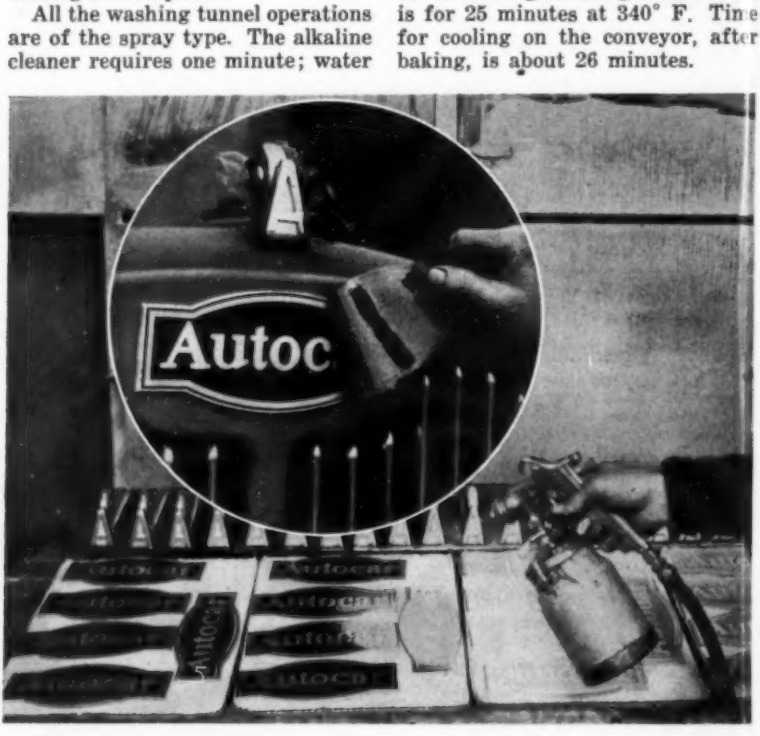

Randolph
CLEAR LACQUER FOR METAL
Quality is more important in Lacquer for Metal than in any other type. Positive adhesion, freedom from tarnish and ease of application are features of the Randolph finishes listed in this folder.
Randolph
PRODUCTS COMPANY
Cortlandt, New Jersey
DOPES · LACQUERS · ENAMELS

Randolph
PRODUCTS COMPANY
Cortlandt, New Jersey

DOPES · LACQUERS · ENAMELS

The next and final steps are inspection, labeling, wrapping—the frames in paper sleeves, the other parts in paper bags—and packaging in fiberboard cartons which move down a roller conveyor equipped with a trough arrangement that sets them right side up to facilitate final handling before loading and shipment.

All the washing tunnel operations are of the spray type. The alkaline cleaner requires one minute; water rinse, one minute; spray with 1% Banox solution, one minute; water rinse, 30 seconds; hot chromic acid rinse, 30 seconds. The next operation, drying, requires 6½ minutes; cooling on conveyor, 7½ minutes. After painting, 8½ minutes are allowed for draining off before the parts arrive at the bake oven. Baking in the gas-fired oven is for 25 minutes at 340° F. Time for cooling on the conveyor, after baking, is about 26 minutes.



The above picture shows a workman spraying an opaque quick-drying peel-off coating or masking material over the faces of name plates and radiator ornaments for Autocar trucks. This temporary masking coat will stand handling and "stay put" until a definite effort is made to remove it. Then it can be peeled off "clean," as shown in the insert.

Object of the masking is to prevent sprayed paint from covering the nameplates and ornaments when the trucks are being spray painted at the factory.

The Air Drying of Wrinkle Finishes

MOST industrial finishes of the enamel type are designed to be baked hard in a drying oven. This baking process provides a durable surface by accelerating a chemical reaction within the enamel. Certain finishes will eventually achieve the same characteristics without the application of heat. However, in most cases, manufacturers who attempt to avoid the baking process find that the finish may have the same appearance, adhesion and all the other physical characteristics, except hardness. Therefore, we recommend the application of a small, controlled amount of heat in order to obtain a durable finish.

New Wrinkle, Inc., has been asked many times to provide an air dry finish and in all cases we found that the consumer was seeking a finish with all of the characteristics of baked enamel, but the conditions within his shop were such that he could not control the temperature at which the finish was to dry, nor could he control the humidity within the drying area. It has been our experience that these two variables must be controlled.

The minimum requirements for such control have been taken from the wood finishing art where items in process are left in the finishing room overnight. During that period the temperature of the finishing room is normally maintained at approximately 100° F. Technically, this is not an air dry finish. Practically, it is. The results obtained by manufacturers who use this method have been wholly satisfactory. The hardness of the finish is sufficient to permit packing after exposure in the finishing room for 12 to 16 hours. This is the New Wrinkle recommendation for an air dry finish.

Certain processes require the assembly of many component parts. The method of obtaining a finish, as outlined above, has proven that all parts will achieve the same textured finish, thereby permitting their assembly into an attractive finished article.—NEW WRINKLE, INC.

R. B. Story Joins Sales Staff of Chicago Bronze & Color

Roy B. Story of Gary, Ind., has joined the sales staff of Chicago Bronze & Color Works, 2601-75 W. Grand Ave., Chicago (a division of Allied Finishing Specialties Co.) Mr. Story will represent the firm in calling on both dealer accounts and industrial users in northern Indiana and southern Michigan.

Ferro Appoints R. H. Jaeger Nashville Sales Manager

C. D. Clawson, President, Ferro Enamel Corp., Cleveland, Ohio, announces the appointment of Roy H. Jaeger as Manager of Ferro's Nashville sales territory.

Mr. Jaeger is well known in the porcelain enameling industry, having been associated with the field for many years. From 1942 until 1945 he served with the War Production Board in St. Louis,

Roy H. Jaeger
Manager of Ferro's
Nashvillle, Tenn.
Sales Territory

terminating his service in the capacity of Chief Facilities Officer. Late in 1945 he joined Ferro Chemical Corporation, a Ferro Enamel Corporation subsidiary, as St. Louis District Manager.

Mr. Jaeger succeeds Mr. Paul Kates as Nashville District Manager. Mr. Kates recently resigned to take up new duties as Factory Superintendent, Industrial Enameling, Inc., New Orleans.

Finishing

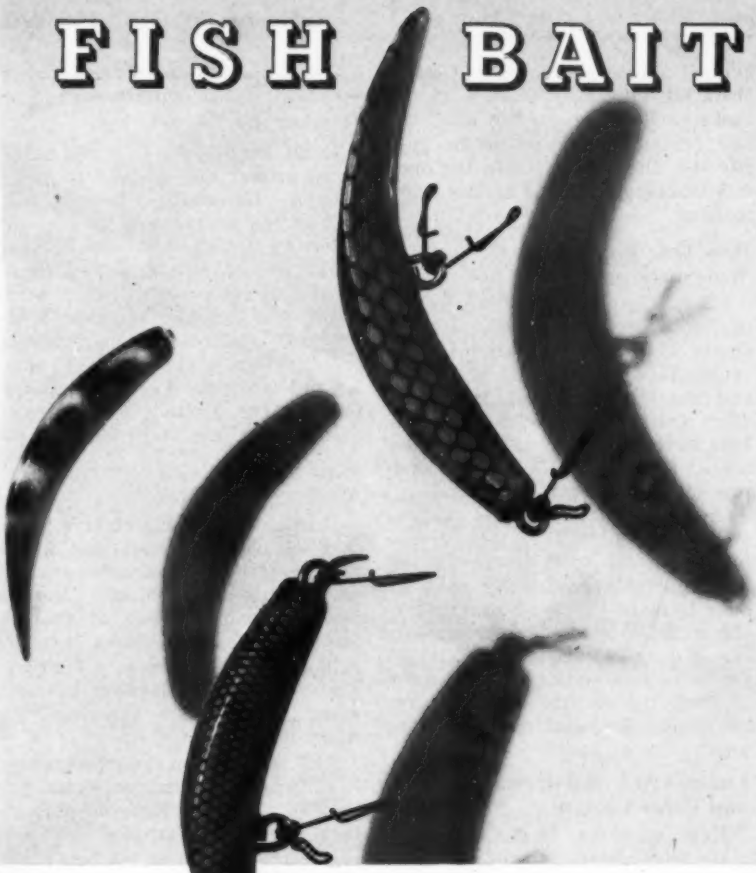
THREE FACTORS are of utmost importance in producing good artificial bait for use in fishing. First, the lure must be designed correctly as to shape, size, color and markings. The shape largely determines the activity of the lure in the water, that is its resemblence to live bait. Size, of course, is important for various species of fish. Color and markings play a big part in attracting the fish to the lure.

Secondly, the lure must be thoroughly waterproofed, for few finished wood products are subjected so continuously to soaking in water.

Thirdly, the finish must be tough and have excellent adhesion. Fishing lures or plugs are often thrown

● Lures being spotted with pencil spray gun. All color markings air-dry while the lure is still mounted on spring wire clamp and suspended by pins to a wood frame.

FISH BAIT



BY
CHARLES
HELIN

Manager of Helin Tackle Co., Detroit, gives the step by step procedure used in waterproofing, painting, masking, decorating his famous flatfish lures.

against submerged rocks and other obstacles, especially when used for casting. They are used in both salt and fresh water, and to be real effective they must retain the special markings as well as the color coating.

How Our Wood Is Waterproofed

Lures are received in the finishing room, in the white, with a single 1/32-in. hole bored in the rounded or tail end of the plug, and the lead eye notch is cut in. They are placed in wire mesh baskets which have hinged lids, and the loaded baskets then are submerged in a special oil for 24 hours. Placing lures in the covered wire baskets makes it possible to keep them submerged in the oil and prevents the wood plugs from floating. This is done to make the wood waterproof. the room in which the waterproofing is done is kept at 85° F. at all times for best results. Upon removal from the oil, the wooden lures are placed in metal mesh trays to air dry for 48 hours.

Lures Are Primed, Sealed and Color Coated

Next, each lure is mounted on a piano wire clamp, one end of which is inserted in the 1/32-in. hole in the rounded end of the plug. This is done so that the lures may be clamped on a wood frame (see illustration) for dipping, drying and decorating operations. Each frame will hold 80 regular size lures or 100 of the smaller fly rod bait. The cross bars of the rack are set in at an angle so that when the lure is clamped to the crossbar by means of the tension spring, the plug will be in proper position for dipping and draining to eliminate runs or drops at the flat end.

Lures are dipped in a red oxide metal primer and allowed to drain for about 15 seconds. Then the rack is mounted on the side of a 48-in. revolving double disc wheel. This double disc wheel resembles a large spool for cable; it revolves at a speed of 24-rpm. Each disc holds 12 racks of lures. Temperature in the dip room is kept at 85° F. winter and summer. Warm air passing through and around the lures air-dries the primer in 20 minutes.

How Special Color Markings Are Made

Prime coated lures receive a dip coat of clear lacquer, and again they air dry on the revolving wheel for 30 minutes. This is followed by a dip coat of one of the six base colors—white, black, orange, yellow, light orange or aluminum. These are all pigmented lacquers which air dry on the revolving wheel in 30 minutes.

Still mounted on the wire clamps, the lures are removed from the wooden racks and hung on pins attached to wooden frames, as shown in the illustration at the beginning of this article. Each frame will hold 150 lures. A numbered tag is attached to each frame indicating the specific marking pattern and colors to be applied. Color markings may be divided into three general classifications, namely 1) solid colors with contrasting color spots, 2) stripes and spots, such as the green frog imitation, and 3) variegated colors with either large or small fish scale pattern. *(To p. 62)*

STYROLAC

A LACQUER FINISH for MOLDED STYRENE PRODUCTS

Another "Standard" Success Developed to Meet a Definite Need

1. **Reflects ultra-violet light, thus preventing deterioration of polystyrene**
2. **Protects against crazing**
3. **Dries with usual lacquer speed**
4. **Excellent adhesion and toughness**

STYROLAC may be obtained in water white, clear and all colors.

STANDARD VARNISH WORKS

Engineers of Product Finishes

1000 Richmond Terrace
STATEN ISLAND, N. Y.

2600 Federal Street
CHICAGO, ILLINOIS

Lures, mounted on spring wire clamps attached to wood frames, are dipped. Then the frame is suspended on the double disc wheel (like a cable spool) to air-dry as wheel revolves.

Taking them up in the order named, the method of applying these markings follows. Holding the lure by the spring wire clamp, the dots or spots are made with a pencil spray gun. On the 2-in. long plug there are a total of 12 spots, each of which is made by a single quick depression of the trigger of the gun as the plug is turned from side to side. After this "spotting" the plug is hung back on the frame to dry.

To produce the stripe-and-spot lure which imitates a green frog, a yellow coated plug is inserted in a

Zapon Finishes Give Sleek, Inviting Surface To Winchester Power Chief Flashlight Cases

Counter displays of many brands vie for flashlight sales—But POWER CHIEF is a stand-out because it has style—beauty and "Flash."

Serviceable looking cases imply quality—suggest a strong beam—long life. They make many a prospective buyer reach for this carefully engineered Winchester product.

Zapon Finishes provide variety, beauty and endurance! They produce tough, durable coatings, resistant to scuffing, grease, perspiration and acid. They are easy to apply.

Zapon technical men are at your service to show you how the Zapon line can combine beauty, long-wearing qualities, and attractive variety in any line of products.

Zapon Division, Atlas Powder Company, Stamford, Conn. and North Chicago, Ill.

ZAPON Production Finishes

metal mask (still attached to spring wire clamp) and a green stripe is sprayed lengthwise of the plug, with three cross stripes in green, all on the convex side. Next, six black spots are applied between the green stripes, and finally white lacquer is sprayed on the concave or belly side of the plug.

Spray Color Through Mesh Netting to Make Scales

To produce the scaled lure, for instance, a black plug is wrapped in either fine or coarse mesh netting, depending upon whether a small or large fish scale pattern is desired. Yellow lacquer is sprayed through the netting. The resulting pattern resembles the scales of a fish. After removing the netting, yellow lacquer is sprayed solid on the concave or belly side of the plug. This obscures the scale pattern on the underside of the bait, and the overspray has a tendency to blend into the scale pattern, which eliminates a definite line of demarkation. Dexterity in handling the spray gun while spraying the yellow lacquer accomplishes the same effect on the convex side of the plug, where the scale pattern blends in with the black coat.

Two Final Protective Coats Are Applied

After the color markings air dry, the lures are again clamped to the dipping racks for two coats of clear lacquer. Each coat is air dried on the revolving wheel for 30 minutes. Then the finished lures are removed from the spring wire clamps and transferred to the assembly lines where lead eyes and hooks are attached.

It is important to maintain uniform viscosity of the dipping lacquer. If the lacquer is too thin, lures will not receive proper coverage; if the lacquer is allowed to become too thick, fat runs will develop; also drops will form and adhere to the flat end of the plug. On clear lacquer we use about two parts of lacquer to one part thinner. For pigmented lacquers, one quart of thinner is added to each gallon of lacquer for black, orange and green; and a little less for white, light orange and yellow. Dip pans are kept covered with tight fitting clamped lids when not in use.

Sherwin-Williams Co. Names Muse to Industrial Sales Post

The appointment of Lawrence M. Muse as assistant to G. L. Hehl, General Manager Industrial Division of The Sherwin-Williams Co., is announced by Mr. Hehl.

Lawrence M. Muse is promoted to industrial sales position with Sherwin-Williams

Muse will have charge of developing and promoting industrial sales through Sherwin-Williams branches, as well as in the general industrial maintenance field. He will make his headquarters in Cleveland.

A native of Nashville, Tenn., Muse attended Morgan Preparatory School and in 1936 joined Sherwin-Williams as warehouse stockkeeper at Nashville. Later he was transferred to Chattanooga, Tenn., in graphic arts and trade sales work.

Berry Brothers offers Something Extra*

for products sprayed ELECTROSTATICALLY

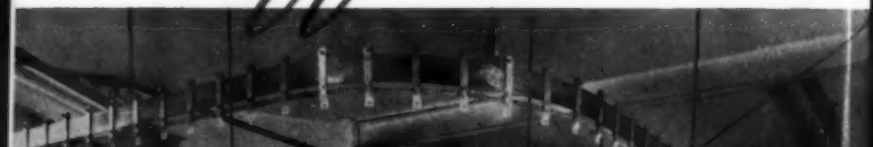
* To do the most efficient and economical job, the paint used in an electrostatic spray system must be properly formulated for each individual product. That takes experience plus service. And that's the "something extra" you get in every Berry Brothers finish. Here is the Berry Brothers way. First we analyze. Next we formulate and test. Then when the finishing job is actually started, technical personnel are on the spot.

Whether you're using the electrostatic method . . . or any of the other finishing methods, let our experts check over your requirements . . . they may be able to suggest improvements. Write today. Berry Brothers, Detroit 7, Mich.

Shown above is the recently installed electrostatic spray unit in the finishing department of Peninsular Metal Products, Detroit.

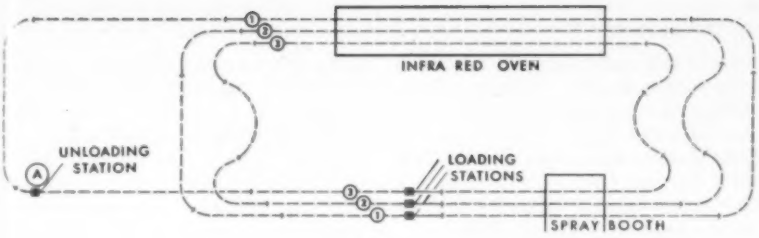
President of the Berna Juvenile Products Co., tells how a 3-in-1 conveyor is used to move through one spray booth and oven, wood and metal parts—some to receive three coats, some two coats, while others get only a single coat.

Different FINISHES ON



Chair bases and step supports are on lines 2 and 1. Spray booth is at right rear. Notice how line No. 1, at unloading station, goes up and over to become No. 3 at loading station.

IN PRODUCING a line of juvenile products such as play-pens, hobby horses, chairs and bedroom furniture, wood, metal and composition materials are used. In finishing these items, various parts require one, two or three coats, depending upon the material and the amount of wear it will receive. For example, let us consider an adjustable junior chair with components of both wood and metal—a chair that junior may use from infancy until he is nine years old.



ON THE *Same* CONVEYOR SETUP

By A. J. BERNA

Above is plan view of our finishing setup, with loading and unloading stations, spray booth and infra-red oven served by a 3-in-1 continuous overhead chain conveyor.

These chairs are finished in three basic colors—white, red and blue—with chrome-plated center stanchions and natural maple tray (for baby days). Metal tube spacers in the upper structure and a metal escutcheon on the base are finished in contrasting colors which serve as trim. These metal spacers and escutcheons receive one coat. The base and step support (also metal) receive two coats. All wood parts receive three coats. Finishes on all metal parts are baked. The wood finishes are fast air dry, with the aid of a very low maintained temperature as they pass through the infra-red tunnel.

Triple Conveyor Solves Handling Problem

To apply the various number of coats to different materials economically and efficiently, in a comparatively small finishing room, presented quite a problem. The number of pieces, their size and shape made it impractical to handle them except on a conveyor.

Due to the fact that three basic colors are used and all of the components to be coated are light in weight, coupled with the one, two and three coat requirements—these factors made a heavy single-track conveyor out of the question. So that all coats could be applied in the same spray booth and baked in the same oven, and without removing parts from the conveyor after each coat, and so they would come out at the take-off station automatically, regardless of the number of coats, a 3-in-1 overhead light-weight chain conveyor was designed, built and installed.

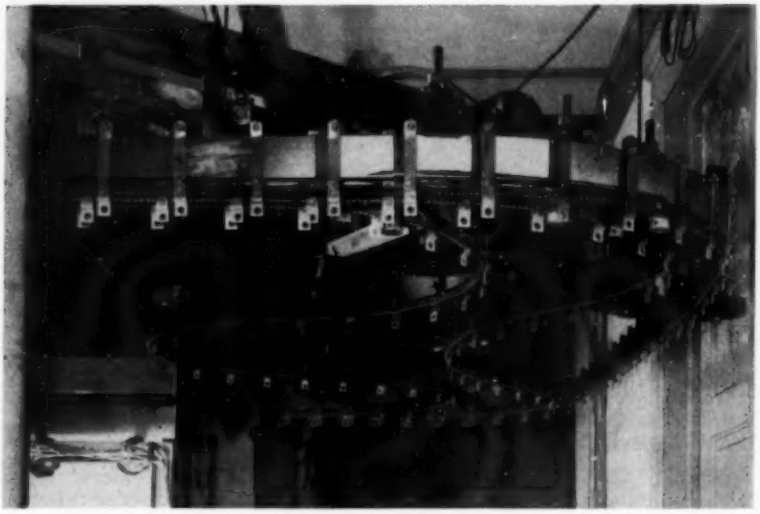
The conveyor is 256-ft. long with hangers on 4½-in. centers. It is operated by a ⅓-hp. motor through a variable-speed drive, at a speed of 3-ft. per minute, and will carry approximately 1000-lbs. The three

lines of the conveyor on the straight away are 1¼-in. apart. This straight away exists in part through the infra-red tunnel which is 24-ft. long and contains 144 nested 250-watt lamps. Control switches for the conveyor and oven are located on the side of the spray booth.

Number of Coats Controlled By the Conveyor

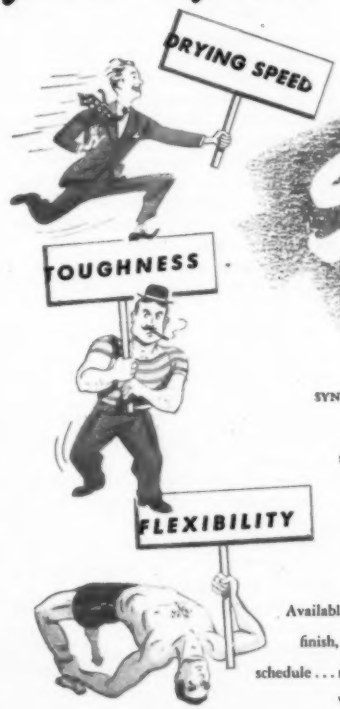
All pieces are racked on pivoted racks; this enables the operator to spray both sides on a single pass through spray booth. Due to the fact that wood and metal parts require a different type of coating, each rack contains either all metal or all wood parts, and they are run through in this manner. These racks are suspended on one of the conveyor lines, depending upon the number of coats the product requires. So that you will understand the advantage of the triple conveyor, let us consider the method of finishing the adjustable chair mentioned previously.

The metal base and step support (hung on racks) are degreased in a trichlorethylene degreaser. Then, since they are to receive two coats, the racks are suspended on the No. 2 line of the conveyor at the loading station. They pass through the spray booth where a synthetic primer is applied; then through the infra-red oven where the primer is baked for eight minutes at 350° F. They leave the oven and cool as



Turns in conveyor at right end of sketch (shown at beginning of article). Racks of parts pass through spray booth wall at left. They enter the infra-red tunnel (lower left) in the same sequence. The motor and variable-speed drive are mounted above the conveyor.

Get all 3 in finish



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. . . where industry goes with finishing problems

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they travel on No. 2 line to a point just ahead of the loading station, where this No. 2 line becomes the No. 1 line of the conveyor. Again they pass through the spray booth for their coating of enamel and through the oven for baking. They automatically come out at point "A" ready for assembly.

Wood components require three coats, so the racks of wood parts are suspended from No. 3 line of the conveyor. They pass through the spray booth for the first coat of synthetic primer, then through the infra-red tunnel with a controlled low temperature of approximately 125° F. Then, as they approach the loading station this No. 3 line becomes No. 2. They are coated with synthetic enamel and dried, and just ahead of the loading station this No. 2 line becomes No. 1. After the third coat is applied and dried, parts come out automatically at point "A" ready for assembly, without handling between coats.

Metal spacers and escutchions receive only one coat, so the racks with these parts are suspended on No. 1 line of the conveyor for a single trip through the spray booth and oven, with the heat of the latter set to its required 350° F. for eight minutes. They are also removed at point "A."

Thus it may be seen that wood or metal parts may be interspersed on the conveyor without regard to the number of coats required, just so long as the racks are suspended from the correct line (No. 3, No. 2 or No. 1) of the conveyor. All racks arriving at point "A" are removed, and each set of parts will have received the correct number of coats.

How We Kicked Out Our Dust Nuisance

OUR COMMERCIAL enameling plant seemed to have all of the dust in the world within its confines. Our principal line of work is the finishing of medical and dental furniture, which calls for a high luster baked finish that is absolutely clean and smooth. We use synthetic enamels. Rejects were running as high as 50%, mostly because of dust pimples. This condition prevailed despite the fact that we were following the rules of dust prevention, such as the use of tack rags, keeping our ovens cleaned with linseed oil, wet sanding, oiling floors, cleaning spray booths often, etc.

A careful study of the problem brought results—brought our dust problem down to "nil", yet what we did was so economical and practicable that it made us feel incompetent that these obvious alterations had not been accomplished before.

The main sources of trouble were our spraying areas and the baking ovens. It seems that dust would collect in at least one of these two spaces, if not both, giving us a "dust finish" in either case.

Taking cognizance of the first obstacle, the spray room, it was noticed that the dust, which was getting on the work, was not merely falling on surfaces; it seemed to have hit the painted surfaces with a definite velocity, which indicated a draft. Inasmuch as the only source of draft in the spraying spaces was that produced by the exhaust fans, a check on the fans was in order. This promptly revealed the fact that our exhaust was far more powerful than necessary.

Since the minimum requirement of air velocity for this area is 100-ft. per minute, and the area (height

(Continued on page 75)

times width) of our spray booths is 56-sq. ft., a multiplication of the two (56x100) would give a free air delivery into each spray booth of 5600-ft. per minute. Since we were actually getting close to 10,000-ft. of air per minute into our spray booths, we obviously could cut down our exhaust to almost half and still be within safety requirements. Substitution of 2¼-in. motor pulleys for the existing 3¼-in. motor pulleys corrected this condition.

Our second alteration in the spray room was to supply each sprayer with an auxiliary booth, 3-ft. wide, 5-ft. high (from the table height up) and 5-ft. deep. Each of these booths was completely covered with light gauge sheet steel except for the front. As spraying operations were completed, the spray coated items were hung or suitably placed in the auxiliary booths until the coating "set"; then they were transferred to trucks or portable racks and moved into the baking oven.

We solved the dust problem in our ovens, too. The main cause for dust here, we discovered, was due to the recirculation and exhaust fans stirring up any dust which had entered when the oven doors were open, or dust which entered through the air intake in the heaters. Since we could not cut down this draft, we simply walled in our trucks and portable racks, as we had the auxiliary booths in the spray room, except that the back and front of each truck were left open to allow for air circulation while the loaded trucks are in the oven.

These alterations not only eliminated our dust problem but allowed us to go back to dry sanding whenever this was considered more practicable.—S. C. RUBINSTEIN, Gen. Mgr., H.I.S. Enameling Co.

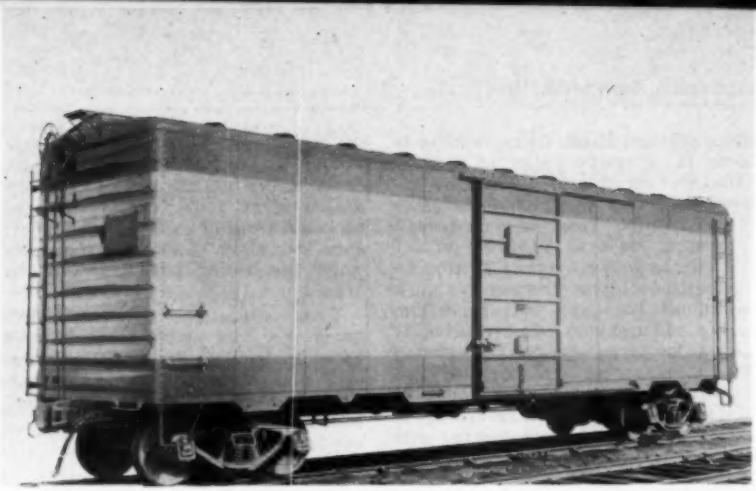
Sterling Sales and Service Depot in Los Angeles

The establishment of a new sales office and a factory-owned and operated service depot at 405 W. Washington St., Los Angeles, Calif., is announced by J. A. Proven, Vice President and General Sales Manager of Sterling Tool Products Co., Chicago manufacturer of portable electric and air-driven sanding machines.

I. C. Bouchard, Sterling's West Coast District Manager, is in charge of the new facility. In addition, E. C. Wheless and Delmer Snyder will operate from the sales office.

The latest equipment for completely servicing all Sterling sanders has been installed so that it is now possible to give the same regular factory servicing and inspection to West Coast Sterling users that is available at the factory in Chicago. A factory trained employee is in charge of the new service depot.

New sales and service depot at 405 W. Wash. St., Los Angeles, Calif., of Sterling Tool Products Co., Chicago manufacturer of portable electric and air driven sanding machines.



The PS-1 freight car with arc welded sides. Only ends are riveted. Sheets making up the sides are butt welded on automatic machines. A modern streamlined car.

PULLMAN'S PRODUCTION SETUP FOR *Painting Freight Cars*

By WALTER W. JOHNSON

THE KEYNOTE of a paint job on railroad freight cars is durability. Freight cars are built for utility and rough use, yet they must present a neat attractive appearance. The PS-1, which is the latest car designed by this company, has arc-welded sides, and the metal sheets that make up the sides are butt welded with an automatic machine. The only rivets used are where ends are riveted to corner posts, roof, and end sill of the car. This type of construction —similar to that used for railroad passenger cars—promotes clean-cut attractive appearance.

Trackage and Equipment in Paint Shop

Surface preparation and all painting operations are taken care of in a building 975-ft. long by 250-ft. wide; it is designed especially for this work. As shown in the accompanying plan drawing, the building contains six parallel tracks, each of which will accommodate twenty 40-ft. freight cars. One end of the building contains a track-level transfer truck which is equipped with winch and cables used for transferring cars from one parallel track to another. At the opposite end of the building an extension

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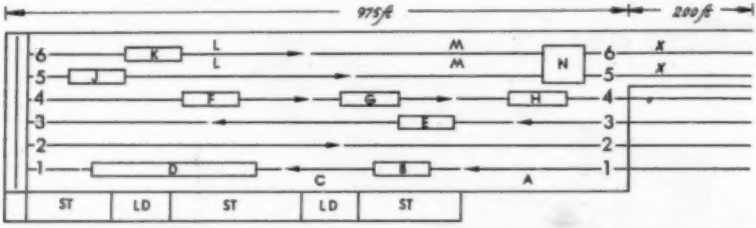

Location of car tracks is indicated by numbers 1, 2, 3, 4, 5, and 6. Paint spray booths are marked D, E, F, G, H, J and K. Other stations are: A—Hot air blasts for drying cars; B—Shot blasting; C—Blow-off after shot blasting; L—Panel decoration and inside stenciling; M—Apply stencil background; N—Weighing scales; X—Main stenciling job; Spaces marked ST are for storage; and spaces marked LD indicate loading docks.

200-ft. long covers tracks 5 and 6. This area is used to provide additional storage space for air drying the stenciled work on cars.

Equipment in the main building includes hot air blast dryers on entrance track No. 1, a shot blast, one spray booth 18-ft. wide by 270-ft. long, six spray booths 18-ft. wide by 60-ft. long and a scale for weighing cars. All spray booths are down-draft water-curtain type, equipped with adjustable steel scaffolding on two sides to support workmen while they are spraying the roof and upper parts of cars. Booths D, J and K have pits for carriage and under-car spraying. Paint materials are sprayed from pressure tanks.

In handling so large a product, it may be readily seen that distances between fabrication and finishing must necessarily be great. Covered trackage and enclosed storage banks are impossible, therefore it is necessary to dry the outsides of all cars entering the paint shop. This drying is done by means of hot air blasts on track No. 1, at the area marked A.

Shot Blast Prepares Metal Surfaces for Primer Coat

When the car enters the shot blast B, a hydraulic hoist is used to lift the car off its trucks. This is done to prevent shot and abrasive material from being deposited in the journal boxes of its trucks. The outside surface of the car is shot-blasted to remove all grease, oil, shop dirt and rust. A pressure of 80-lbs. is used to eject the shot. The blast is equipped with adjustable scaffolding and, like the spray booths, it has a down-draft exhaust. Shot is collected in underfloor pits and returned to a reservoir for re-use. Operators use helments with plexiglass visors and inhalators.

In area C, at the exit end of the shot blast, all surfaces of the car

Paint Foreman of the Pullman-Standard Car Mfg. Co's. Haskell & Barker Michigan City, Indiana, plant explains how the surfaces of metal freight cars and refrigerator cars are cleaned, prepared and spray painted for protection, indentification and decoration.

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are blown off clean, after which the car is replaced on its own trucks just before it enters spray booth D. The first operation in this booth is spraying the car ceiling with an asphalt-base material which has cork added. This coating serves as an insulator and prevents condensation due to atmospheric changes.

As the car moves forward over a pit in booth D, an asphalt-base cement (under seal) is sprayed on the under frame, top and bottom. Next, a synthetic-base primer is sprayed over the entire outside surface. The car is then transferred to track No. 2 which is a delivery track to the wood shop adjoining the paint shop. The primer has ample time to dry as the car moves through the paint shop and into the wood shop where the wood floor and inside lining are installed.

Enamel Top Coats and Stenciling Are Applied

Cars that re-enter the paint shop on track No. 3 are given a double coat of synthetic enamel in booth E. About 30 minutes elapses between coats. An 8-hour air drying period follows. All refrigerator cars are transferred to track No. 4. Other cars are moved either to track 5 or 6 on which identical operations are performed. In spray booths J or K, the last coat of enamel is applied. Trucks and air brake equipment are given a coat of black enamel. A 12-hour drying period follows.

As the car moves along tracks 5 or 6, in areas L and M, the inside walls are stenciled for a loading guide; the outside panel decoration is put on; and the background is applied for the stenciled emblem. The car is weighed and, in area X just beyond the scale, workmen stencil the name of the railroad, car number, size, tare weight and load limit. Also, in this area, the emblem work is completed. All of these numbers and letters are sprayed through metal stencils.

Refrigerator Cars Require Additional Operations

Refrigerator cars receive all of the surface preparation and painting operations given freight cars

Spraying letters through a stencil which is pressed against the side of a freight car. Background color for the emblem was sprayed on, further up the line. Note guides for locating stencil in position.

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and, in addition, their interiors are washed with mineral spirits; areas which will hold ice are given a coat of lead chromate primer. This coating is allowed to air dry for 12 hours. The entire inside surface receives a heavy coat of asphalt-base material with cork added to insulate and prevent condensation.

As refrigerator cars move down track No. 4 the entire inside of the car is sprayed with a commercial varnish in booth F. The last enamel coat is applied in booth G and the second varnish coat is sprayed on the inside in booth H. The varnish coating is needed to prevent the wood odor from affecting foods that are transported in the car.

The paint shop has a capacity for completing 27 freight cars and 12 refrigerator cars each 8-hour shift.

Rubbing "Wet" Varnish

By Rollin H. Wampler

OF COURSE, it isn't possible to rub wet varnish. But there are times when the finisher is called upon to rub it before the film is hard and dry enough for ordinary rubbing procedures. It can be done, but the surface may print, develop haze, and shrink. If these undesirable features can be tolerated, then perhaps we are justified in rubbing it.

Since oils and oil-type solvents will soften varnish too much before it is really hard, these liquids must be avoided as rubbing lubricants. Use water, or an emulsion of oil in water. There are so-called water-soluble oils which can be poured into water to make a milky-white emulsion. Use about one part of oil to eight or ten parts of water. This emulsion lubricant has less softening effect on the varnish, and it does not leave whitish deposits in carvings and moldings. In addition, the emulsifying agent has valuable wetting-out and cleaning-up properties.

Ordinarily, it is not possible to use wet-or-dry sandpaper for rubbing varnishes because it cuts too fast and will clog. This is especially true if the rubbing is done by machine. However, it can be done by hand with a felt block if extreme care is taken even if the varnish is not as dry as it should be. The paper will clog quickly and may scratch if not used very carefully.

Perhaps the best way to rub varnishes that are not thoroughly dry is to use a very light-weight reciprocating rubbing machine, with felt blocks. Instead of using pumice as an abrasive, use tripoli which is finer, cuts more slowly, and is not so likely to scratch. Use water or oil-in-water emulsion as a lubricant.

Clean up the surface carefully. Then polish by hand with fine rottenstone and the same kind of emulsion that was used for rubbing. Finally, "bring up" the polish with a little commercial cream emulsion polish that will not soften the varnish. You may have to experiment a little before you find one that brings out a nice surface without softening it excessively. Avoid strong polishes. Above all, do not attempt to use wax.

As stated at the beginning of this article the surface will print if wrapped and packed immediately and it may lose some of its excellent appearance. But if it has to be done, this is the best method I know of.

New pH Indicators

If you have occasion to test solutions for their acidity or alkalinity (pH values) LaMotte Chemical Products Co., Towson, Baltimore 4, Md., offers test chemicals which turn in color and indicate closely pH values.

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THEORY AND PRACTICE OF *Furniture Finishing*

PART IV

Author's Note: In this section I will discuss lacquers, varnishes and heat-cured top coats; also the enamels and undercoaters for use in finishing new furniture.

By ROLLIN H. WAMPLER

MODERN cellulose-type of lacquers are widely used in furniture finishing. They consist of nitrocellulose (or other cellulose esters and ethers), resins (hard and soft), and plasticizers or softeners, dispersed in a suitable solvent combination. Such lacquers dry to a glossy finish. If a dull, flat sheen is required, suitable flattening agents (zinc and aluminum stearates, waxes, and fine silica pigments) are ground into the gloss lacquer.

Characteristics of Lacquers for Finishing Furniture

Furniture lacquers are usually supplied ready for use. They contain from 18% to 30% solids—sometimes more—and they are applied by spraying or dipping. Brushing, except on small areas, is not usually satisfactory. Some lacquers may require thinning with lacquer thinner for use.

Lacquers dry very rapidly. They may be recoated in 30 to 60 minutes. At least two coats are required on the best grades of furniture. Overnight air-drying produces a hard dry film suitable for rubbing and packing. Force-drying the 2-coat system for one or two hours at 130° to 150° F. accomplishes the same result.

Considerable work has been done in efforts to increase the solids content of lacquers, since that has always been a serious limitation. Two coats of lacquer are required to give a finish equal to one coat of varnish or heat-curing urea furniture finish. Hot-spraying, where the lacquer is heated to 160° F. or thereabouts prior to spraying, has found limited use; but the process does not permit spraying at much higher solids. However, recent research indicates lacquers of high quality can be made to spray cold up to 38% solids. Lacquers of 30% to 32% solids are now being used commercially at ordinary temperatures. *(Continued on page 89)*

Lacquers are sprayed at 45 to 60-lbs. air pressure, with 10 to 20-lbs. fluid pressure in the tank. The higher the solids and the viscosity, the more air pressure is required for perfect atomization and flow. In general, however, the lowest air pressure possible should be used for reasons of economy.

Lacquer Dries Quickly to a Hard Tough Stable Film

Lacquers for use on furniture have a number of advantages over other materials. Chief among these is their speed of drying. They set so fast that they do not pick up dirt and lint from the air, and may be recoated in an hour or less.

Lacquers are more print-proof at both room and elevated (150° F.) temperatures than most varnishes, although not more so than urea finishes. Their film is hard, tough and stable, since no oxidation ordinarily takes place. Good lacquer films are hard and tough and wear well. They do not discolor on drying or aging to the extent of ordinary varnishes, which is an advantage in light finishes.

On the other hand, lacquers suffer in requiring more coats than varnishes, and in coverage (square feet per gallon). The net result is that they are somewhat more expensive than most varnishes. Recent studies in furniture finishing indicate that lacquers are the most expensive topcoats.

What Varnishes Are and What They Contain

Oleoresinous varnishes are mixtures or reaction products of hard resins and drying oils, cooked together at high temperatures. They contain metallic salts or soaps (chiefly of cobalt, lead, manganese, zinc, and calcium) to hasten the drying, and solvents such as turpentine, mineral spirits, VM&P naphtha and others, to aid in application.

Alkyd or polyester varnishes are reaction products of polybasic alcohols (glycerine, pentaerithrytol, etc.), dibasic acids (chiefly phthalic), and drying oil or resin fatty acids. They also contain driers and solvents. Stronger solvents such as xylol and high flash naphtha are often required where the amount of oil is low. Drying-type alkyds will air-dry or bake satisfactorily. The short-oil (low-oil) types are best for baking. Non-drying alkyds must be modified or hardened with nitrocellulose or with urea of melamine resins in order to air-dry or bake at low temperatures.

Short Oil and Long Oil Varnishes

Alkyd and oleoresinous varnishes are both used in furniture work. The short-oil oleoresinous type (5 to 15 gallons of oil per 100-lbs. of resin) are preferred because they dry quickly to a hard film which may be rubbed and polished to a smooth surface. Such varnishes are called cabinet rubbing, or rubbing and polishing varnishes.

The less oil, the better the polishing qualities, but in practice extremely short varnishes are too brittle. A good average oil length for furniture work is 8 to 12 gallons. The longer types in this range will not take a high polish, and are better for rubbing to a dull finish. Where the utmost in toughness and durability is re-

quired, as on restaurant tables, varnishes in the floor varnish range (20 to 30 gallon oil length) are sometimes used. For outdoor furniture, spar varnish (above 30 gallon oil length) is required.

Ordinary alkyd resins are not used alone for furniture work. Modified with hard resins, they can be used as rubbing varnishes. They dry quickly, but lack fullness and are more expensive than oleoresinous types. Unmodified alkyds that contain 50% oil are good for outdoor use, but the clear films tend to dry hard, though rather slowly.

Gloss Varnishes and Flat Varnishes

Gloss furniture varnishes, properly applied, dry to clear, glossy, hard films that may be rubbed and polished. A dull-rubbed surface may be simulated without the labor of rubbing by using flat varnish. Such a varnish is generally made by finely dispersing in gloss varnish a flattening agent such as aluminum stearate, magnesium carbonate, silica, waxes, insoluble resins, etc. These varnishes may also be rubbed whenever required.

Most furniture varnishes air-dry overnight, when they are suitable for rubbing and packing. Some few may be force-dried for two to four hours at 150° F., but they will not withstand much rubbing, and are quite likely to print when pressure-packed.

Most varnishes are sprayed at 60 to 70-lbs. air pressure and 10 to 20-lbs. fluid pressure, depending upon the viscosity of the varnish and the adjustments on the spray gun. Varnishes can be applied by any means—spraying, roller-coating, dipping, or tumbling. Most of them contain 40% to 50% solids at application consistency.

Synthetic Finishes to Cure At 125° to 160° F.

Urea-alkyd furniture finishes, often called "synthetic", have good properties. They are combinations of urea (sometimes melamine) resins, alkyd resins, hard resins, oils, and plasticizers. They contain, or have added to them at the time of application, catalysts which will cure the urea resin at 125° to 160° F. This curing process converts the urea resin to an infusible, insoluble film which is highly resistant to alcohol, soaps, water and other solvents that destroy most other films. The film is hard and print-proof.

Urea-alkyd finishes are sprayed at 35% to 45% solids, and one coat over sealer is usually sufficient. The material is sprayed at the same pressure as varnishes, allowed to flash or flow for 20 to 30 minutes, and cured for one to two hours at 120° to 150° F. Other suitable drying schedules are four hours at 125° F., and overnight (15 hours) at 110° F. After cooling 30 minutes the film is rubbed and cleaned up, or rubbed and polished.

Urea-alkyd finishes for furniture are supplied in gloss and flat sheen. Although more expensive than lacquer per gallon, they are more economical because they have better coverage and one coat suffices where two coats of lacquer would be required.

These finishes are best applied by spraying, but they may also be roller-coated or dipped. They do not brush satisfactorily because they set too quickly. *(To page 92)*

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— takes heavy reduction
— will not blush or bloom
— rubs easily, but does not have to be rubbed.

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Urea-alkyd furniture finishes do not air-dry so very well. In common with lacquers, they are especially adapted to high-speed furniture finishing on a conveyor line where suitable ovens are available.

Characteristics of Modern Color Enamel Finishes

Enamel finishes are used on much of the kitchen and breakfast-room furniture and, to a limited extent, on bedroom furniture.

Enamels and enamel undercoaters for furniture are made on a lacquer, oleoresinous varnish, or alkyd basis. They are made by grinding into the clear vehicle various hiding and extender pigments. Their formulation and manufacture are highly developed skills which the simple statement above is not meant to obscure.

Undercoaters for Use Under Enamel Coats

Enamel undercoaters (sometimes called primers or primer-surfaces) contain a high proportion of pigments, so that the films they produce are dull and sand quickly to a smooth surface. This high pigmentation also prevents absorption of the enamel by the wood, so that they function as sealers.

Because their pigments are likely to settle fairly rapidly in storage at application consistency, enamel undercoaters are shipped as heavy liquids that require reduction with a suitable thinner before application.

Lacquer undercoaters for wood are sprayed at about the same air and fluid pressures as clear lacquers. They dry to sand in 30 to 60 minutes.

Varnish and alkyd types of undercoaters spray at 60 to 70-lbs. air pressure and 10 to 20-lbs. fluid pressure. They air-dry to sand in two to four hours, or force-dry in about one hour at 130° to 140° F. These undercoaters may be supplied in the color desired by the manufacturer.

Solid-hiding undercoaters on wood are dry-sanded smooth with No. 5/0 or 6/0 sandpaper before enameling. Care must be taken to see that corners or edges are not sanded through; otherwise holdout and hiding on these areas may be inadequate.

Because the surface is completely hidden, the cheaper, small-pore woods such as poplar, white and yellow pine, fir, and others are often used for enameled furniture. If large-pore woods that require filling in clear work are employed, then they also must be filled before the undercoaters are applied. The undercoater will not produce a smooth surface in one coat over such woods.

Various Types of Enamels for Use on Furniture

Enamels are formulated with smaller amounts of pigments, which usually hide better than those used in undercoaters, in order to dry to a high gloss or to a semi-gloss, or to a somewhat flat and smooth surface. Like undercoaters, they are usually shipped at a heavy consistency to minimize settling.

Lacquer, varnish, and alkyd enamels are sprayed at about the same conditions as the corresponding undercoaters. Lacquer enamels air-dry to recoat in 30 minutes to two hours, and to pack or to rub in

You can produce on any material the following surface finishes:

FELT - SUEDE LEATHER - MOHAIR VELOUR - VELVET - CARPET

FUNCTIONAL USES

Used in the auto, airplane, radio, electrical, phonograph, ceramics, furniture and many other industries for surfacing all sorts of materials to provide

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DECORATIVE USES

Applied in various lengths and colors to wood, paper, cloth, metal, etc., the following effects are produced—

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FELT AND SUEDE SURFACE

*"Raymix"—a flock of rayon fibres, trademarked under U. S. Patent No. 427949 to produce a suede effect of utmost realism on any surface.
*"Kingcote"—a cotton flock trademarked under U. S. Patent No. 423572, producing a suede effect at minimum cost.

MOHAIR, VELOUR AND VELVET SURFACE

"Raycote"—a flock composed of uniformly cut rayon fibres to produce on any surface a pile effect such as velvet, plush, or velour. Made under U. S. Patent No. 2014947.

SYNTHETIC CARPET

"Harecote"—a flock composed of animal fibres, produces a durable carpet or rug material.

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15 to 24 hours, or they may be force-dried for one to two hours at 130° F. Varnish and alkyd types air-dry in 24 hours or force-dry in about eight hours at 130° to 150° F.

Varnish and alkyd type enamels may be applied over any type of undercoater, but lacquer enamels are applied only over lacquer undercoaters.

The usual enamel finish consists of one coat of undercoater and one or two coats of enamel. On furniture some decoration is often used, such as stenciling, shading, highlighting, decalcomanias, striping or antiquing. The antiquing is done by applying glazing stain over the enamel and blending out. Naturally the flat surfaces are wiped clean, and only a little is left in turnings and carvings.

"Color Eye" Announced

A scientific color brain, accurate to within one-half of 1%, has been developed in the research laboratories of the Pittsburgh Plate Glass Co.

The new instrument photo-electrically records the response, sensitivity, and discrimination characteristics of the human eye. With greater accuracy than the eye, it measures color differences and divides by the total reflected light to give comparisons in terms of percentage reflectance difference, regardless of illumination level or color density.

Color differences are read directly on a meter having two ranges. Approximate luminosity is read directly on a logarithmic scale from 0.1% to 100%. Accurate luminosity or tristimulus values may be obtained by a direct reading micrometer-controlled optical slit comparing the sample to a white standard.

The Color Eye is substantially unaffected by illumination level and stray light. Color comparison is made on a basis of luminosity and direct tristimulus measurements. Colors thus matched are industrially satisfactory regardless of the detailed spectrophotometric color curve of the samples.

The Color Eye, adaptable to innumerable industrial applications, will be marketed by the Instrument Development Laboratories, Inc., Williston Park, Long Island, N. Y.

Promotions of Personnel at Zapon's North Chicago Plant

According to an announcement made by the Atlas Powder Co.'s North Chicago, Ill., Zapon Division plant, the following promotions have been made:

Cyrus W. Craig is now Assistant General Manager. In his new capacity he will be in charge of methods, accounting and costs. Mr. Craig has had many years of accounting experience.

Clayton Casler, formerly Assistant General Sales Manager, has been made General Sales Manager at North Chicago.

Left, above
Cyrus W. Craig

Below, left
Clayton Casler

Below, right
Harris G. Beck, Jr.

Mr. Casler, a graduate engineer from Northwestern University, was a Lieutenant Commander in the navy during the recent war.

Mr. F. H. Apeland, who has been with the organization since 1933, was named Manager of the North Chicago Zapon plant. He attended Northwestern University and served in the army during World War One. Mr. F. H. Apeland first joined Zapon Division of the Atlas Powder Co. as Purchasing Agent and Cost Accountant.

Harris G. Beck, Jr., has been promoted to Technical Director of Zapon's North Chicago plant, and also has been placed in charge of the Sales Engineers whose work is an important function of the merchandising and service programs. Mr. Beck is a graduate Chemical Engineer from the University of Chicago.

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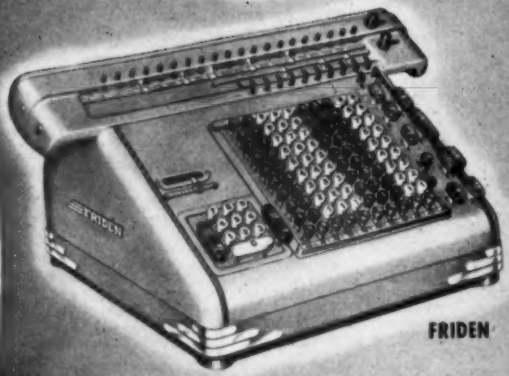

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W. P. FULLER & CO.
Industrial Finishes Division
San Francisco 19, California

Synthetic Graining Rollers

We are interested in synthetic rubber rolls for production graining, as described on page 31 of February issue of INDUSTRIAL FINISHING. Where can these rolls be obtained?—S.G.A.

The author of the article tells us that these rollers can be obtained from Rapid Roller Co., 2558 S. Federal St., Chicago, Ill.—ED.

Tumbling Machines for Golf Balls

Will you be so kind as to give us the names of concerns who manufacture tumbling barrels for use in painting and washing? We are mainly interested in painting and washing golf balls.—E. Golf Co.

In a letter we are naming several firms that can furnish tumbling equipment.—ED.

Dry Paint Sludge Problem

Referring to October 1947 issue of INDUSTRIAL FINISHING, under "Letters from Readers", on page 100, there appears a question entitled, "What to do With Dry Paint Sludge", signed C.F.Co. The article is followed with the Editor's statement, "We solicit suggestions on this." I am pleased to advise that I have had success in dealing with this same problem, and would appreciate your forwarding this to the proper individual at the C.F.Co.—P. J. Prendergast, Cleveland, Ohio.

Wanted: Finishing School

We have in our employ a young man who we would like to make foreman over our industrial finishing department. He is a veteran of War II and we would like for him to study the finishing of all types of surfaces with all types of finish.

One reason for this letter to you is to find out if you can inform us of some course, either correspondence or practical, which he could get under the G. I. Bill. We woud appreciate this information as soon as possible.—P.S.C.

Sorry. We know of no trade school, college or university that offers a course of instruction suitable for preparing your man for a foremanship.—ED.

Fine Sandblast to "Dull" Gloss Varnish

Could you supply me with information as to where I might obtain a sandblasting outfit, of moderate price, that would be satisfactory for use in dulling or removing gloss varnish from wood trim in residences?

We understand that there is such a device made that can be operated off the air from a paint spray outfit that puts out around 12 or 15-ft. of air.—J.P.

We are not sure which concern furnishes sandblast equipment for the purpose mentioned, but are sending you, by letter, a list of manufacturers of sandblasting outfits.—ED.

Auto Painting School

The Division of Vocational Education is developing a course of instruction for auto painting apprentices in the State of Oregon. For reference material, we would like to have a copy of the following articles published in past issues of INDUSTRIAL FINISHING Magazine:

"How Buick Finishes Hoods, Fenders and Wheels" by L. Strong and H. F. Reves (June 1947 issue, pages 49, 50, 52, 54 and 56).

"The Ford Finish" by E. M. Buell (March 1947 issue, pages 60, 61, 62, 63, 64, 66, 68 and 70).

You may bill this department for any cost involved.—Elmer H. Halstead, State Supervisor, Public Service Training, Salem, Ore.

Tear sheets of the articles specified are being sent to you.—ED.

Smooth Finish on Jet 'Planes

Will you please mail to the writer four reprints on the article apnearing in the April 1947 issue entitled, "Special Smooth Finish on Jet Airplanes"?—S.Co.

We have no reprints of this article but are sending you tear sheets of same from a few mutilated copies that happen to be on hand at the moment.—ED.

For Jewel Box Beauty and New Sales Appeal . . .

"STYLON" Finishes

Here are three typical examples of product-betterment with Stylon finishes — the clever flower cradle with its baby-soft, velvety feel; the sound-cushioned, jewel-box lining of the metal trays; the furry, life-like surface of the toy rabbit. In every case a luxurious, cost-cutting finish of Stylon added rich, colorful beauty and exciting new sales appeal.

In the belief that new beauty and sales appeal will help sell your product better, we invite you to submit samples to our Product Engineering Department for free Stylonizing tests. Our new Stylon booklet, complete with 34 color swatches, tells the complete story. Write for your free copy today.

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Bleached Mahogany Blisters

Kindly furnish us information regarding the bleaching of mahogany. At present, we are using lacquer, which blisters on bleached mahogany. Do you have any treatment or process which would eliminate this difficulty? If so, please forward us the necessary instructions.—A. MFG. CO.

Bleached open-pore woods always have a tendency to cause blistering of top coats. The trouble is caused by the gradual release of the tightly-held vapors formed in the bleaching process. The condition can sometimes be helped by sponging off the surface with clear water after the bleach has dried three or four hours. Allow the treated wood to dry thoroughly and then finish.

Some finishers prefer to sponge off the bleached surface with water to which is added 3% to 5% acetic acid or vinegar; or a solution consisting of one gallon of water and 4-oz. of sodium bisufite. These solutions have the effect of neutralizing the alkalinity of deposits from the bleaching solution.

The only sure cure is to allow enough time for the vapors (produced by bleaching) to escape before beginning the finishing process. For mahogany veneer, allow 48 hours of air-drying or 18 hours of force-drying at 110° to 120° F.; or eight hours of force-drying at 140° F. will usually insure removal of the vapors. This drying must occur before finishing. Solid mahogany may require more time because, in this case, the vapors may penetrate deeper, owing to the absence of any glueline barrier, as in veneered work.

Blisters are much more likely to appear if the top coats are force-dried. The drying times indicated in the foregoing paragraph are usually adequate for top coats to be force-dried at a relatively low temperature, say not over 130° F. For air-dried lacquer coats, the times indicated may be somewhat reduced.

It is difficult to be more specific than this because wood is a highly variable material. The only safe rule is to begin by allowing the bleached surfaces to air-dry about 72 hours. Then gradually cut down the time until signs of blistering appear. Of course, if you have facilities for force-drying, the same procedure can be used. Do not, however, attempt to force-dry the bleach until it has had 30 to 60 minutes to react at room temperature. Force-drying too soon may decrease effectiveness of bleaching treatment.—R. H. WAMPLER.

In regard to the blistering of bleached mahogany wood, the fault is not in the lacquer, but in the bleach—or rather to improper handling of the bleached wood surfaces in preparation for finishing.

I assume that you are using a 2-solution bleach, and that after the final application of No. 2 solution, you wait the required length of time before starting to finish the wood. This drying time should be a full 24 hours to let the moisture dry out of the

Measure a finish by what it will do; not by the price per gallon.

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Industrial Finishes
NEW YORK BUFFALO CHICAGO
FORT ERIE, ONT.

wood and to let the full action of the bleach take effect. I realize there will be some exception taken to the length of time suggested here—and I know that many finishers do start finishing before this, but only under favorable conditions.

Even then the experts get a reaction occasionally, especially in humid weather. I have started finishing over bleached woods in a few hours, but then only when I had subjected the work to force-drying, and could take precautions against gaseous bubbles forming. These precautions included the use of an acideous wash and, when dry, carefully sanding and blowing off all traces of sand dust from the wood.

I believe that to finish over a bleached wood surface without rinsing will require 48 to 72 hours of normal drying time, depending on the type of wood and the drying conditions. A light sanding and a blow-off of the sanding dust is still required.

Finishing can start after 12 to 24 hours, or over night if good drying conditions prevail, provided the finisher sponges off the bleached wood with a solution made by adding one cup of ordinary vinegar to one gallon of warm water. Let the rinsed surface dry for about one hour and sand lightly to remove the raised fuzz. Drying can be further hastened by an alcohol rinse. This will absorb moisture in the wood and will dry more rapidly. A short drying period after the alcohol rinse, and the wood is ready for finishing.

Greater care and exactness in following the rules of bleaching are required for open grain woods, such as mahogany and walnut, than for close grain woods such as birch and maple. The open pores of mahogany will retain moisture, in the form of bleaching chemical, for a long time. When the finisher begins to finish wood in this condition he may not notice anything unusual in the first or sealer coat, because this coat of lacquer will dry fast, and usually it is not applied so heavy as to form an unusual film thickness in one coat.

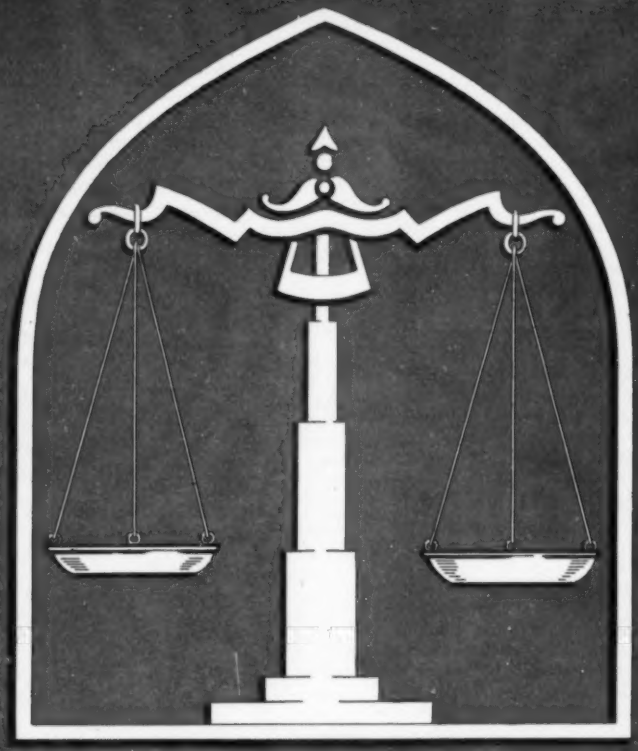
Nevertheless, if some bleaching action remains in the wood, small gas pockets will form in each pore. Trouble will not show up until the second or sometimes the third coat of finishing lacquer is applied. Then these gas pockets will expand because the succeeding coats of lacquer have softened up the preceding lacquer coats sufficiently to let the gases expand and come up. This action will cause a bubble or blister to form; some break, while others stand up like a piece of bubble gum.

When this trouble has occurred there is nothing the finisher can do except wash off the entire finish and start all over. If only a few of these bubbles appear, the piece can sometimes be saved by spraying on a thin coat of white or clear shellac to act as an insulation coat for the succeeding lacquer finish. Of course, this is not a good finishing procedure, but in an emergency it will sometimes work.

The way to successful bleaching is to make sure that the piece is really dry before starting any finishing operations. Rinse the bleached surface and, when it is dry, sand off all raised fibers and blow off the resulting dust before beginning your finishing schedule. Time allowed for drying, more than any other factor, is the secret of good bleaching.—E. HOGSTROM.

Coloring Aluminum and Brass Zippers

We have received an inquiry from a manufacturer who is trying to color aluminum and brass zippers so they will not show against the tape. Anodizing was not successful and the com-



JONES-DABNEY

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DIVISION OF DEVOE & RAYNOLDS CO., INC.

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pany is now trying an enamel which is applied to the top of the zipper and baked in an infra-red drying oven. The enamel being used dries slowly and chips from the zipper too easily. The concern asks for information about an enamel that could be used for this purpose and a method of application.—T. I. S.

Before going into this, I would like to point out one reason for failure thus far to produce suitable coatings for this work. It is the lack of willingness on the part of some manufacturers (users of finishes) to pay for the quality necessary for good results.

My recommendations for a suitable material are listed, and you can pass them on to satisfy the inquirer. I'll try to make this on a practical basis with materials procurable at this time. The recommendation should work on spray or roller coat or squeegee application, with some solvent juggling.

Pigment—Use flush colors or pigment dispersions in alkyd, miscible with Melamine resin—or grind pigment in alkyd resin if preferred. Use pigments of highest opacity rating and best heat tolerance at 350° F.

Vehicle—Melamine-alkyd resins.

Pigment to about twice normal pigmentation for good hiding, so that a very thin film of enamel can be applied and produce opacity.

Metal Preparation—Anodizing* or Alodizing** will produce best results insofar as adhesion is concerned. However, Bonderite 170 or a phosphoric acid treatment would do if the other is not available.

Application—Apply a thin coat of enamel; bake at 350° to 400° F. for 10 to 15 minutes, and try at same temperature up to 30 minutes. This temperature will discolor brass; however, since it is opaqued, it should not matter.

This enamel will do the job. If a little more adhesion is necessary, use up to 1% of phosphoric acid or Mono Chlor Maleic Anhydride Dist. as an aid to etch the metal, and accelerate cure by polymerization.

For good results on zipper work, using low cost raw materials, it can best be done by baking the coating at temperatures up to 400° to 450° F. —if this can be tolerated, which it can on browns, blacks and certain other dark shades.

Use as an alternate vehicle, 15 gallon wood oil, phenolic resin varnish where color can be tolerated, and bake at a high temperature.

Some micro-crystaline wax can be used if baked at high temperature. This permits excellent slip or slide of zipper.

A few things that come to my mind at the moment, which are relatively important in connection with the problem are:

Excellent dispersion so that a smooth mar-resistant film, free of protruding particles, can be obtained.

Good metal cleaning and pretreatment; best system would be alodizing. Use a vehicle or resin with fairly high acid number.

---

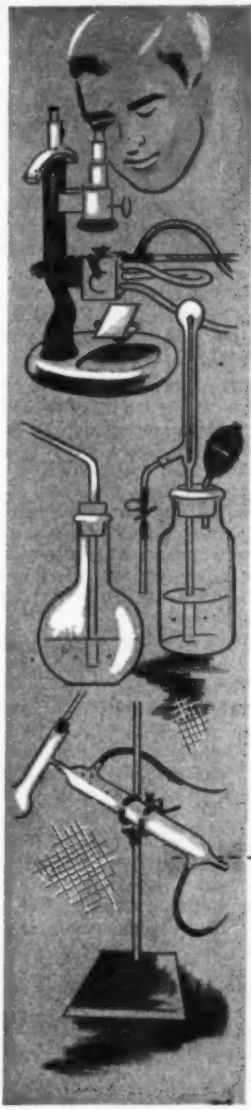
*In the question it is stated that Anodizing has been tried. I assume the concern refers to coloring by this process rather than surface treatment for adhesion. If such is the case, I can well understand the failure, since the process is unreliable for true color work, and the color itself will not withstand rough treatment.

**Alodizing would be my choice as the most suitable pretreatment, and I believe it is superior to Anodizing in many respects, based on overall evaluation.

Why Rubbing Oil Damages Finish on Panels

Under the above title I notice an inquiry in the "Questions and Answers" of February issue of INDUSTRIAL FINISHING Magazine, pages 106 and 108.

In addition to the points that are made in the published answer, I wish



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to tell you that on a number of occasions I have found this condition when the background or stain color of the finish is too dark or strong in comparison to the color of the filler. This causes the filler to appear gray because its color is slightly lighter than that of the stain. This defect may escape unnoticed.

When rubbing oil penetrates into the end grain of the wood it darkens the filler and causes the finish to appear much darker in these spots than where the oil has not penetrated. The correction, when the trouble is caused from this trouble, is to redesign both the stain and the filler so as to bring them into proper relationship with each other for color strength.—M. J. PEARCE.

To Stain African Hardwood Black

We are having considerable difficulty with our clarinets made of African granadilla woood. Some of the wood's original color is a bluish black but, unfortunately, a large amount of the wood coming through now is brown, and our difficulties arise in trying to get a black stain to penetrate this hardwood.

If you know of any process or material that could be used, we certainly would appreciate hearing from you. We would be more than pleased to submit samples of the wood, if necessary.—L.G.Co.

Although I am not at all familiar with African granadilla wood, three things occur to me that might help you.

The first is to treat the brown wood with a solution made up in the proportion of 8-oz. of caustic soda to a gallon of water. The wood can be dipped in this solution, or the solution can be swabbed on with a fiber brush or a cotton cloth. Be sure that your workmen use rubber gloves, as the caustic solution is very severe on the hands.

The caustic solution should be allowed to remain in contact with the wood for five or ten minutes, and then be rinsed off with clear water. Allow the wood to dry thoroughly before staining. This treatment should so raise the grain and open the pores of the wood that the stain can penetrate and do its work.

If the wood is inclined to be oily, treatment by soaking in toluol or lacquer thinner should enable the stain to take well.

Of course, there are definite limits to the jetness or depth of color one can get with a black dye-type stain. It occurs to me that you might try staining the wood with some very fine carbon black paste. Take 2-oz. of paste, ¼-oz. of japan drier, and add about 14-oz. of VM&P naphtha. Use this as a pigment wiping stain. It should certainly get you the depth of color you desire.—R. H. WAMPLER.

This problem is difficult but not impossible. Ordinary types of stains—water, oil, spirit—will not work so well on this type of hardwood which is similar to ebony, teak and rosewood. These woods are dense in texture and contain an oily substance that is difficult to treat with ordinary stain.

I believe the best stain for this wood is an acid-type stain or a special-type water stain. The acid stain works on the wood itself and changes the color of the wood chemically. It would be best to submit samples of the wood to the laboratory of some stain manufacturer, so that the chemist can make up a formula to suit the particular kind of wood.

There are a number of common chemicals that will stain wood black,

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What's more, S-I-P Lacquer Thinners are *low in cost.* Grade for grade, they *cost you less per gallon.*

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LT-2725. Maximum economy in a *good* reducer: our lowest priced thinner.

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LT-2727. For general use in automotive and furniture lacquers; excellent working qualities and blush resistance.

LT-2728. Top grade reducer recommended for use where blushing is normally encountered and maximum flow-out is required.

LT-2729. High quality lacquer retarding thinner for maximum blush elimination. Improves flow and gloss, reduces orange peel and overspray.

NOTE: If you have a special thinner problem, send us details and we will submit samples made for your particular job. No obligation.

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but I believe it is best to use a stain made up by a reliable stain house.

Water stains will work on this wood, but their use involves proper preparation of the wood before they are used. Also there should be special equipment for forcing the water dye into the wood. A sponging of caustic soda (mild solution, 2-oz. per gallon of hot water) before staining will help the water stain to penetrate. A tannic acid solution applied hot sometimes helps.

Bichromate of potash, swabbed on before staining or added to the stain mix, will help get penetration of the dye. If the stain can be used hot this will also help.

Water-soluble nigrosene powder or crystals can be used in a saturated solution in hot water. Use fresh, if possible, and store only in earthen crocks or glass containers. When cool, there will be a precipitation of the nigrosene crystals to the bottom of the container, but this residue will redisolve when heated.

If it is possible and if the shape and size of the wood pieces allow it, a pressure tank can be used to force the water dye into the wood. Place the water stain into the pressure tank and immerse the articles in it. Apply pressure as much as the tank will allow. Experience will show you how long you will have to leave the articles in the tank before they will take on a permanent black dye. After some experimenting, use a saw to cut through a number of pieces to see how far the dye has penetrated. Do not use this method on glued stock.

I believe the acid type stain would be less trouble, although the pressure way of staining with water dye has been used with good results. I believe that piano manufacturers have used this method, and perhaps they still do, for staining the black keys of piano keyboards. Also, it is used for dying some of the fancy colored wood inlays or strip inlays.

Caution should be used with some types of acid stains to prevent skin irritation. Rubber gloves should be worn with this kind of chemical mixture. The maker of the stain will tell you just what to do in case of accident, when using a stain that might be harmful if spilled on the skin, or splashed on the face or hands. I hope this will give you some ideas on how to solve your problem.—E. HOGSTROM.

Force-Dry Prime Coat on Outside Wood Sash?

We are contemplating the installation of a conveyor system in connection with priming wood sash and frames. Our problem is to get information concerning the best product to use for our priming, the time needed for drying, and the best method of drying.

We intend to dip the sash and frames in Permatox WR (A Chapman Chemical Co. product) and then give them two coats of some primer suitable for outside woodwork, and if possible, run them through a heated drying room to dry them in the least possible time, without damaging the paint or wood.

We know of several concerns who paint and dry products on a conveyor line for interior use, but know of none who paint wood products for exterior use. If you can give us any information on this subject, or refer us to anyone who can, we will appreciate it.—G. C. Co. (Florida).

There may be concerns who force dry paint products to be used outside, but I do not know of any. There is probably a good reason for this, namely the moisture content of the wood at the time of painting.

For products to be used outside,

WHAT'S YOUR CLEAR LACQUER PROBLEM?

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HEAT RESISTANCE

TARNISH PROTECTION

FUMES MOISTURE

CLARITY PERSPIRATION

Use Kirco Clear Blended Lacquers To Insure A Trouble Free Finish On Metal - Wood Or Plastics.

KIRCO CLEAR COVERS THE FREEDOM TRAIN

KIRCO

Kirker CHEMICAL COMPANY

ONE EAST ELEVENTH STREET • PATERSON 4, NEW JERSEY

the wood is generally dried to 10% to 12% moisture content. It is assumed that you are building sash and frames of Florida pine which has the characteristics of all wood in that it swells and shrinks, and probably warps and twists under stresses and strains.

The Permatox treated wood surfaces must be dry before any primer can be applied, and this drying may require as much as 24 hours—or it may be hastened somewhat if the sash are placed on cross sticks in a warm room, not over 100° F., with recirculated air and exhaust ducts.

Fairly fast drying primers and finish coats are available for outside work, but I do not believe it would be practical to attempt to dry the prime coats on a conveyor which would pass through an oven. It is my opinion that if sufficient heat were used to dry either the wood preservative or primer coat, the moisture content of the wood in the sash and the frames would be quickly reduced to a point where the wood might warp and twist out of shape. Even though it remained straight and true, it would likely swell and twist after it was installed in a building where it would be subjected to excessive moisture.

You might experiment with the warm room idea, with fans to recirculate the air and exhaust the solvent-laden air after priming, to reduce the drying time as much as possible without reducing the moisture content of the wood more than 2% to 3%.

Also, I suggest that you write The Georgia School of Technology, Atlanta, Ga., (Georgia Tech.). It is my understanding that one of their engineers has conducted extensive experiments on various wood treatments and the painting of wood—C. P.

The problem of force-drying exterior finishes on a conveyor line on wood products is not an easy one. I think it can be done in your case, however. It will be necessary to use a highly pigmented primer. I would suggest any of the primers developed for 2-coat house painting. These primers have high pigment volume and they penetrate to a limited extent.

I do not believe it will be necessary to apply more than one coat if you get on a full, even coat. One full coat, applied by spraying, should be enough. Dipping might be better for your products. In that case you may have to apply two coats.

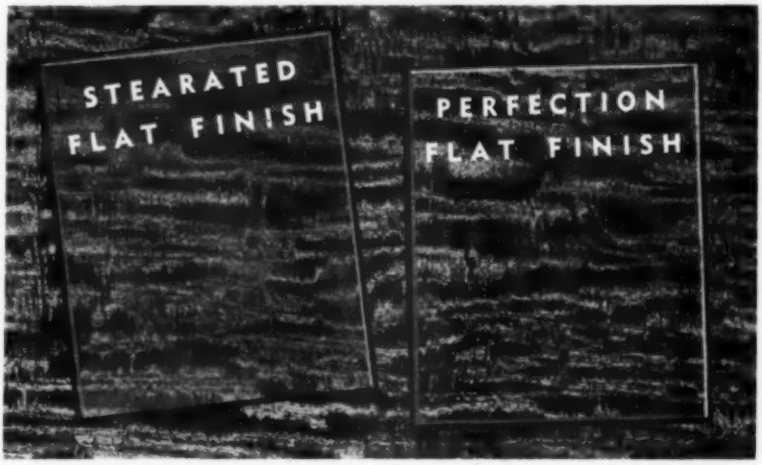
For force-drying along the conveyor line, about four to six hours at 150° F., should be adequate. That will permit handling and shipping, or recoating, as the case may require.

If your wood is thoroughly dry, four to six hours at 150° F. should not cause warping or cracking. If you do encounter these troubles, you may be obliged to lengthen the force-drying period to about 18 hours at 110° to 120° F. Since you probably do not operate around the clock anyway, the overnight period can very well be used for the force-drying. If you go to this, it might be better to simply put the sash and frames in a force-drying room overnight rather than run the conveyor through the drying room.—R. H. WAMPLER.

Although we have a nice business in air drying primers for prefabricated houses, both interior and exterior work, we are not supplying any for use in force-drying systems. We believe that, with certain modifications of our formula, we can make it adaptable for your purpose. At present we are checking this in the laboratory and should be able, within one-week's time, to give you complete data as to temperature and length of time in the oven.

It would greatly facilitate our work if you would be kind enough to send

MOTTLE MAHOGANY—



TOO BEAUTIFUL TO HIDE—

Perfection Flat Finishes will bring out the full beauty of this African Mottle Mahogany (or any other wood grain) without any cloudiness or distortion.

Perfection Flat Finishes — varnish and lacquer types—do not contain any of the conventional stearates or flattening agents and are therefore perfectly clear.

For a lustrous rubbed effect, free from distortion or orange peel, try Perfection Flat Finishes. Write for free samples.

PERFECTION PAINT & COLOR COMPANY

715 E. Maryland St., Indianapolis 2, Indiana

Perfection SYNTHETIC FLAT FINISHES

WATER-PROOF LIQUOR-PROOF

us scrap pieces of the wood that will be used, and also about one quart of the Permatox WR, in order that we might check your complete system.—RAYMOND C. ADAMS.

Random Comment on the Industrial Scene

(Continued from page 6)

There are answers to all of these questions. They will have to be answered if a firm expects to move forward.

* * *

American industry has invested approximately 3 billion dollars in manufacturing plant expansion and new industrial buildings in the 37 states east of the Rocky Mountains since the close of World War II, according to an analysis made by F. W. Dodge Corporation.

Processing industries, such as chemicals, rubber and textiles, accounted for about one half of the amount in building contract awards during the 30-month period, while the manufacturing industries, such as automobile and machinery manufacturing, accounted for the remainder.

* * *

Furniture Sales Up. While forecasters had "buried" the furniture and home furnishings industries early this year, reports for the first quarter indicate that the stores of the nation enjoyed the best similar three months in their history. This was the statement of Col. Lawrence H. Whiting, after a spot check of trade conditions.

"Much of the business increase is due to increased sales promotion," Col. Whiting said. "Business has not come easily, as it did during the war years. Both stores and factories are having to work for it. Most of them are spending considerably more in advertising, a number are spending the same, and none are spending less—and staying in business.

* * *

Thinner Insulation. Development of a new insulating tool that increases freezer capacity without increasing bulk and at the same time insures lower, more uniform temperatures for longer periods of time has been announced by Monsanto Chemical Co.

The new tool is Santocel, a free-flowing powder already in full production at Monsanto's Merrimac Division headquarters in Everett, Mass.

In a practical demonstration, the substitution of two inches of Santocel for the normal 4-inch insulation increased the capacity of a 4-cu. ft. freezer to 7¼-cu. ft. Insulating factors remained the same. Santocel maintained the same efficiency as the previous insulation but nearly doubled the capacity of the freezer.

* * *

New Furniture Coating. Monsanto Chemical Co. announces a new flame resisting coating for upholstered outdoor furniture. Known as "Ultrasol", it may be applied to paper or fabric to produce either a smooth colorful finish or a leather-like effect. It is available in pastel or bright colors.

* * *

Waterproof Wood. A new wood preservative has been patented, which, it is said imparts high insulation resistance to the material treated. It is composed of water-soluble compounds of copper, chromium and arsenic. When wood is impregnated with an aqueous solution of these compounds in proper relative proportions, certain substances in the wood set up reactions to form new compounds, all of which are water-insoluble. This feature is of especial importance in treating wood having any sort of metallic attachments.

Highlights on

HILO

Product Finishes

NU-SYNTOL

Gloss White Synthetic Enamel
Quick Baking at Low Heat

A beautiful white in one coat on smooth metal. A finish which resists the action of alkalies, grease, cosmetics, hair tonic, liquor, fruit juices, gasoline, mineral spirits and machine oil.

NU-SYNTOL requires only a 10-minute bake at 250° F. to provide a smooth, full, high-gloss white surface. It is a wonderful help in production where oven capacity is limited.

Send for Hilo Bulletin #26
and a 5-gallon trial lot of NU-SYNTOL
on approval, transportation paid.

HILO

HILO VARNISH CORPORATION

42-60 Stewart Avenue, Brooklyn 6, N. Y.
2420 Washburne Ave., Chicago 8, Ill. • Park Sq. Bldg. Boston 16, Mass.

New Exterior Enamel Developed For Use on Aluminum Products

A new synthetic heat-hardening low-gloss enamel, especially suited for factory-finishing of aluminum intended for outside exposure has just been developed by The Sherwin-Williams Industrial Division, Cleveland 1, Ohio.

The new product is already being employed satisfactorily by a large producer of pre-painted aluminum siding, and expected to see further widespread use in such products as aluminum storm-window sash, fencing, spouting and other types of building products.

The finish has excellent durability. The fact that it is spray-applied under ideal conditions and fast-baked provides hardness equal to that of refrigerator finishes.

Actual tests have shown the finish to be very resistant to 2000-hour accelerated weatherometer exposure and 1500-hour salt spray exposure. It also has withstood 50 cycles of a heat and cold test during which there was noticeable expansion and contraction of the aluminum base.

Sherwin-Williams Industrial engineers have perfected a special system for using the new finish. After proper surface preparation the aluminum may be roller coated with primer and baked, then fabricated and sprayed with the finish bake coat; or, both the primer and finish coat may be applied after the metal has been fabricated.

Development of the new finish is seen as a practical answer for the objection of many consumers to raw aluminum finish on products for exterior use. In the case of house siding, for example, the factory-painted product eliminates the need for painting after the siding has been applied.

New Portable Compressors Offered by A.B.S. Co.

Two portable fractional-horsepower air compressors are announced by American Brake Shoe Co.'s Kellogg Division, Rochester 9, N. Y. Both models produce 100% oil-free air. Special designing eliminates all contact or contamination of the air with lubri-

Model 8-C at top; Model 17-C at bottom.

If it pleases the eye—it's half sold! And merchandise sells itself when it's finished **right!** Finished right means UNITED Finish, for UNITED Lacquers flow free, dry fast, hard and tough.

UNITED High Speed Lacquers have been **tried, tested** and **proved** superior by manufacturers. In gloss, satin or dull finishes they're absolutely uniform in quality and performance. Every standard formulation is **time** tested for durability.

What's YOUR Problem?

Send your requirements to us. We'll find the **right** finish and send you a generous working sample. No obligation, of course.

"FIRST WITH THE FINISH"

United Lacquer Mfg. Corp.

General Office, Laboratory, Factory: LINDEN 3, NEW JERSEY
New England Plant: EVERETT, MASSACHUSETTS

UNITED LACQUER MFG. CORP.

LACQUERS
THINNERS
SYNTHETICS
METALLIZED FINISHES
SPECIAL COATINGS

cating oil. Both compressors are readily adjustable for different pressures.

Model 17-C (shown with handle) delivers 4.4-cu.ft. of free air per minute at 40-lbs. pressure. It is powered with a ½-h.p. electric motor. New "lubricated for life" sealed ball bearings eliminate the necessity of oiling and the danger of burned-out bearings. The entire mechanism is encased in welded steel frames for greater stability—a new feature of construction in diaphragm type compressors. The model has twin air cleaners which are quickly accessible by loosening only two cover screws.

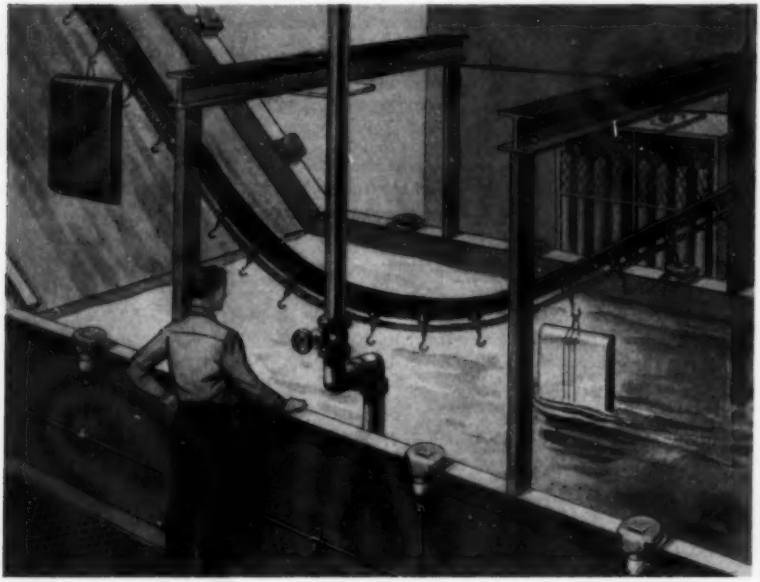
Model 8-C delivers 2.2-cu.ft. of air per minute at 25-lbs. pressure. It is powered with a ¼-h.p. electric motor. Equipped with a single air cleaner, this model has no cylinders, pistons or rings to wear out. A force feed oil system assures positive lubrication. The unit is mounted on a sturdy steel base with rubber feet.

Both compressors are particularly adaptable for low pressure, high volume work where dependable, quality performance at low cost is needed.

New Nozzle for Dip Tank Fire Protection

Fire protection engineers of Walter Kidde & Co., 675 Main St., Belleville 9, N. J., have developed a new "L" type Multi-Jet nozzle, designed for smothering dip tank and drainboard flammable liquid fires with a carbon dioxide gas.

The new "L" type nozzle is designed to emit fire-killing carbon dioxide in a fan-shaped blanket that



Typical conveyorized dip tank protected by installation of L-type multi-jet nozzles.

QUALASOLE

America's Foremost

PADDING LACQUER

QUALATONE PRODUCTS, INC.

21 GAY STREET, NEW YORK 14, N. Y.

hugs the liquid surface in tanks or along drainboards. It is equipped with a mounting flange for easy attachment to the top reinforcing angle with which most tanks are equipped. Depth of the nozzle from front to back is kept at a minimum by the new design (about 4¾-in. for ½-in. supply pipe) to permit installation of inlet piping close to tank sides.

Because of the flat fan-shaped pattern of the carbon dioxide gas discharge put out by the new nozzle, more complete protection of tank liquid surface, or drainboards, can be achieved with fewer nozzles and less piping. Inspection, maintenance and cleaning are also simplified.

"Parlon" in Paints Gives Extra Protection

Finishes of Parlon, Hecules Chlorinated rubber, show excellent resistance to both alkali and acid; and because it dries quickly, even in the presence of moisture, Parlon finishes are suitable for concrete-type surfaces. Conventional oil-base paints may saponify when applied to concrete surfaces. Parlon is not an oil, and resists this action of alkali. It makes drab surfaces colorful and keeps them that way.

New Coatings for Plastics and Masonite

Development of new coatings for plastic products, as well as a new baking enamel for masonite and metal products, such as furniture, shelving, and toys, is announced by The Monroe Sander Corp., 10-26 Forty-sixth Avenue, of Long Island City, N. Y., manufacturer of industrial finishes.

Eugene G. Bloch, executive vice-president, stated that this new baking enamel not only produces a smooth, glasslike surface, but after application requires about half the time previously needed for sanding and polishing. It also gives a very high gloss, hides blemishes and irregularities to an unusual degree, and has unique flowing properties.

Mr. Bloch pointed out, too, that the development by The Monroe Sander Corp. of new finishes specially suited for coating plastic materials, such as cellulose acetate, ethyl cellulose, butyrate, polystyrene, phenol-formaldehyde and urea-formaldehyde, will solve some vexing coating problems for manufacturers in a wide variety of fields.

Extensive research by The Monroe Sander Corp., Mr. Bloch stated, resulted in the development of new finishes which have eliminated those and other problems for users of plastic materials. These finishes, he said, cost no more than ordinary ones, and can be adapted to individual plant requirements either by spraying, brushing, dipping, or tumbling.

Skin Protector for Finishers' Hands

Production of Kum-Klean, a skin protector for paint shop and other industrial workers, has been resumed by the Advance Paint Co., Indianapolis, Ind. Its manufacture was discontinued during the war years due to the unavailability of the proper ingredients.

Kum-Klean was formulated more than 12 years ago for use by the Advance Paint Co.'s own employees. It proved so effective that it was put on the market for workers in all types of manufacturing establishments where paint, grease, oils and chemicals are used.

This preparation, rubbed into the hands before beginning work, protects the skin from all harmful chemicals, paints or varnishes. When work is

complete, all grease, paint and oils are easily washed from the hands in water. Kum-Klean is not soluble in paint or varnish reducer, and for that reason is particularly effective for use in paint shops and finishing rooms. The ingredients used in formulating Kum-Klean help prevent dermatitis. Kum-Klean is available in 8-oz. cans for individual use, 12 cans to the carton.

Improved Aluminnum Paint

A new process of imparting to aluminum pigments the ability to inhibit fungicidal growth, infestation by wood eating insects and the growth of mold, is announced by Reynolds Metals Co., Louisville, Ky. This new process, to be known by the trade designation "Reynoldized" results in an aluminum paint having all inherent preservative qualities, plus the ability to render wood and other surfaces passive to the effects of mold, rot and other forms of fungi activity, coupled with resistance to termites, carpenter ants and other types of chewing and boring insects.

Kemclad Appliance Finishes Announced by S-W Co.

A new line of industrial finishes, especially developed for household appliance products is announced by The Sherwin-Williams Co., Cleveland 1, Ohio.

Known as "Kemclad Appliance Finishes", the new products are employed following special systems of application engineered by the company's paint chemists and based on the latest technical research in protective coatings for such purposes.

The new finishes feature greater ease of application, with excellent opacity and build; economy of application; range of baking adaptable to

The DUST-ALL
TACK RAG
Collects Dust and Dirt Too!

IT picks up the dust, dirt and specks that spoil paint jobs. It assures a pride-arousing finish job and a profitable one. Get them from your dealer or write us.

The Dust-All Tack Rag comes in the characteristic Red Checkered Bag.

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SPECIALISTS
in fine
INDUSTRIAL
FINISHES

MANUFACTURING
a COMPLETE
LINE of INDUSTRIAL
and Automotive Finishes
for many of the
Country's finest firms

LET US IMPROVE
Your Product's Finish

Send us your most difficult problem. Our laboratory staff is second to none.

STRATHMORE PRODUCTS

Strathmore
PRODUCTS INC
1970 W. Fayette St.
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numerous types of products; improved color stability and retention; greater resistance to fruit acids, beverages, food and alkali; good adhesion; hard, tough, durable and marproof finished surface; and resistance to humidity and soap-water immersion.

Exceptional heat-resistance makes the new finishes particularly suited for such products as ironers, roasters and stoves. The Kemclad Appliance Finishing System will stand a temperature, for a short time, as high as 400° F.

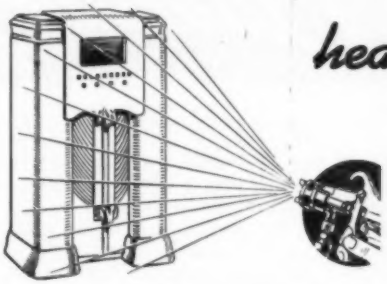
The system includes formulas for high-bake application on products such as refrigerators and washing machines; for low-bake application, as for cabinet work, bread boxes, canisters, etc.; and for air-drying on products which are so finished.

Blush Proof Lacquer No. 480

A recent innovation in the finishing field has been the introduction of an absolutely blush-proof, water-clear lacquer. The unusual combined properties of this material make it outstanding, and applicable to every finishing application with few exceptions.

1) It can be applied in any type of weather without use of retarders.
2) It is adherent to all surfaces.
3) Is absolutely water-clear.
4) Is scuff-proof.
5) May be air-dried or baked at low temperatures.
6) Can be sprayed, dipped or roller coated.
7) Is fast drying.
8) In either clear or pigmented form, it has a very high gloss.
9) Can be rubbed or lightly buffed to a satin finish.
10) Oil-soluble dyes are readily dissolved in it.

The selling agent for this product is Langlotz & Co., 1 Hanson Place, Brooklyn 17, N. Y.



heated LACQUER
CUTS COSTS

SIMAX lacquer, formulated specifically for heating, has body equal to varnish. One coat does the work of two coats of cold lacquer, saving time and labor. When heated it sprays on easily—has greater flow and better flow, thus reducing rubbing costs. It produces an exceptionally tough film with great durability.

Originators of "hot" lacquers, Wabash Products Company now offers improved materials formulated to meet today's requirements. Let us demonstrate!

SIMAX
THE FINISH THAT LASTS

WABASH PRODUCTS COMPANY
Lacquers • Enamels • Sealers • Stains • Fillers
Varnishes • Thinners • Synthetics • Wrinkles
16th and Hulman Sts., Terre Haute, Indiana

I. C. D. FORMULA NINE
NON-INFLAMMABLE
« *wax free* REMOVER »

for paint, varnish, lacquer, baked enamel, adhesives
EASY TO APPLY—NO AFTER CLEANING

I. C. D. FORMULA 9 is the standard of safety and quality . . can be sprayed or brushed . . doesn't raise grain nor discolor . . quickly removes all kinds of finishes and coatings from any surface or material . . costs less to use . . saves time, labor and material.

BRUSH CLEANER I. C. D.— Non-inflammable brush cleaner works fast . . does not injure nor loosen the bristles. Easy to use . . leaves the bristles clean as a whistle. Order a gallon can and convince yourself.

ORDER TRIAL GALLON AT DRUM PRICE

INDUSTRIAL CHEMICAL DEVELOPMENT CORP.
247 MADISON AVE. NEW YORK 17, N. Y.

Industrial FINISHING Editorial

Testing Finishes for Performance

★ I believe that the testing of furniture finishes for aging, under drastic service conditions, is important and will help to prevent complaints. I suggest the following testing procedure:

Several panels of about one foot square, of the same wood used in each suite of furniture manufactured, are as a human body can be made immune to a disease.—H. H. CONNELLY. sprayed with each finish used in the factory. These panels are stored under various conditions under which the furniture may be used. For example, alternate temperature changes from 100° to 40° F.; humidity changes from 90% to 0%; sunlight or ultraviolet light exposures; or any combination of these conditions should be employed.

Convenience usually dictates the testing cycles All finishes employed should be rated performance-wise on the basis of these exposures. The appearance of checking, chipping, discoloration, softening, blushing, etc., of the finish indicates the failure. The greater the number of cycles necessary for a sign of failure to appear the better the quality of the finish.

With finishes rated in such a fashion, only the better ones should be employed in regular production. Then the number of customer complaints can be reduced substantially and reorders over a period of years, by customers, should increase.

The various resistance tests, such as resistance to contact with cold and hot water, alcohol, naphtha, pressure, hot plate, etc., will do much to eliminate the "weak resistance" finishes and prevent customer complaints—if only those finishes which have good resistance to these tests are employed.

It is also a good practice to keep samples of every lot of finish employed, if possible, along with the date that each was used in the factory. Then any complaints can be checked when registered, to determine what application conditions should be avoided to prevent a recurrence of such a fault.

The exposed panels should also be retained to cover complaints, and for exhibition to finish salesmen in efforts to stimulate an improvement in the quality of their finishes. Where the "strong resistance" finishes are excellent, the panels so finished will be valuable for exhibition to customers whenever possible.—H. H. WATJEN.

★ *Guest Editorial . . . Many readers can write an excellent editorial—two or three paragraphs that present a timely suggestion or valuable idea which will stimulate thought on a live subject. The Editor welcomes guest editorials, paying for those published.*

Silk Screen Methods . . . and Other Trends

★ During the war the use of silk screens for producing imitation wood graining on plain woods was discontinued, but this practice is now coming back stronger than before the war.

With the many new uses for plastics, special attention is being directed

toward decorating and placing lettering and designs on straight and molded plastics and acetate sheets; for instance on such products as cake covers, toys, life preservers, etc.

New automatic screen process machines, with an output of 2000 and over per hour, are now in use.

There is a trend toward a wider use of silk screen methods for imprinting, decorating, or otherwise marking machinery, toys, household equipment, etc., even in runs of from one up to any quantity, at a considerable saving.

Additional quick highlights on What's New and Whats' Ahead, include the following:

A novel system of marking or coating switch boxes and tunnels in N.Y. subways with phosphorescent paint, so that workers or passengers may easily find such boxes in case of a breakdown in service.

In the mirror trade, the use of a spraying system for applying silver nitrate or mirror solution, instead of the slower steam table method.

Airplane interiors are being coated with flock in both solid and patterned colors.—BERT ZAHN.

Train Men for Leadership

★ The finishing industry is seriously threatened by a lack of men who have supervisory ability. When it comes to adding a new department or sub-department boss, the past practice of taking a man off the floor because he may have had a "pull" or a pleasing personality is definitely out of order. It is out of order because new systems of production procedures are semi-scientific.

New types of materials and methods of systematic production with modern equipment require a man to whom management can delegate real

DON'T RISK FIRE!

Use

SAF-TE

NON-BURNING Remover

SAF-TE fills an industrial need of long standing. It's a powerful, fast-acting remover that dissolves any finish regardless of age or thickness —*without the danger of fire!* Approved by the U. S. Dept. of Commerce as "ship stores", *SAF-TE absolutely will not burn!* Reduces paint, varnish, lacquer, enamel, shellac, or synthetics to a soft sludge that comes off easily. And since it leaves no waxy residue, SAF-TE requires no after-wash.

Let us help YOU

During 30 years of serving leading industrial firms, we have developed removers to meet every need. Let us help you with your removing problem. Fill out coupon below.

WILSON-IMPERIAL CO.
125 Chestnut Street, Newark 5, N. J.

WILSON-IMPERIAL CO.,
125 Chestnut St., Newark 5, N. J.

We are interested in stripping the finish from _____

Type of Finish_____

Name_____

Company_____

Street_____

City_____State_____

Remove..PRODUCTION
LINE DUST · LINT and
SAND PARTICLES
MAKE YOUR FINISH
TACK OFF THOSE SPECKS SPARKLE
Crystal
TACK RAG
Speed Up Your FINISHING PRODUCTION LINE with this Soft Tacky Cloth
BCP TACKY WIPERS
Available in GROSS LOTS thru PAINT DEALERS or from the Processor
Exclusively Processed by
BAUGHN CHEMICAL PRODUCTS CO.
7027 N. Ravenswood Ave., Chicago, U.S.A.

MIRACLE
5 Gallon
BLUE
BOY
Model
PAINT REJUVENATOR
Restores Paints, Lacquers, Enamel Products and Pigment Primers, to original consistency in 3 to 10 minutes without opening the can. Available for Round or Square 5-gallon cans. Explosion proof electrical equipment if desired. Also other units from ¼-pint to 50-gallon drum capacity available. Originators of Paint Rejuvenating Equipment—ten years—thousands of satisfied users.
Miracle Paint Rejuvenator Co.
127 E. 9TH STREET ST. PAUL 1, MINN.

responsiblities and be assured of getting satisfactory results—tangible and intangible. There are specific standards for the proper application of finishing materials by spraying, dipping, roller coating, etc.

There are standards for continuous finishing by means of conveyors, and various types of drying applications. Hand and machine sanding operations before coating and between some coats, involves the use of a wide assortment of wet or dry sandpaper in an arrangement of fine to heavier grades, with special glues to hold the grit to the paper or cloth backings. The wide range of fillers and putties for the repair of damaged places is almost without limit.

Then there is that important phase of labor and a knowledge of the rights of labor and management. . . .

These are not all of the responsibilities that a supervisory man must be able to assume. These are just some of the main features. Others include an understanding of the problems of management; production and maintenance costs; an intelligent appraisal of new products, etc.

Although a lot of advice is given to the effect: "Leave your worries in the plant when you leave for the day", the truth of the matter is that the only way a man can be up to the minute and on his toes, after he is made a boss, is to keep posted through reading current literature that deals with his general job. He will have to do some of this in his hours of leisure at home, and through study on his own time when he is away from the pressure of factory routine.

To be sure of having men "heavy" enough to assume the aforementioned load, top management must train men through gradual stages in the plant. In small plants the owners should do this; in large factories a definite program for the training of supervisory employees should be

turned over to a capable executive—one who is sincere in his efforts to make "boss men". He, in turn, must have the confidence of top management; he must be given a definite scope of authority and responsibility.

Supervisors should be trained in all phases of the industry in which they must learn everything from the proper way of sweeping the floor to how orders are handled in the office, the routine of orders in the plant, the way materials are ordered in all departments, cost of materials, and how or why certain materials are more desirable than others, and how to place labor in the best stations in the production set-up.

The trainee should be thoroughly versed in the history of the plant and its aims and policies. He should be trained to fill jobs ahead of him, either permanently or temporarily when such jobs may be open. Top management can safeguard its interests and promote its continuity by accepting the duties of training men for capable leadership. Heirs may come and heirs may go, but errs and errors in your plant management, due to untrained leadership, will leave the heirs in the air.—N. A.

Clean Metal Before Applying Paint

★ This happened in a plant that has been in operation for more than 50 years, where by this time they should know how necessary it is to clean metal properly before it is painted or lacquered. The metal surfaces of their products were first cleaned, then primed, colored, and finally clear coated. All finishing was done with lacquer.

Suddenly the prime coat started to come off in spots. This trouble was blamed on the primer—which

NEW!
DIFFERENT!!
BETTER!!!

ALLIED'S Electro Cold Stripper is not "just another" paint remover but has been formulated along radically different lines to do an outstanding job on the production line.

Removes paints, lacquers, enamels, synthetics and wrinkles while you watch. The finish actually "pops off." Especially effective on hard-to-remove baked-type finishes. It is made to handle really tough jobs.

NON-INFLAMMABLE. Non-injurious to hands or metal in time required for removal of paint film.

Simply dip, shake well and dry. Then wash with pressure stream of water or wipe well with rag and refinish immediately. Leaves no "after film."

Many industrial users tell us this is the best Stripper they have ever used. Perhaps it will help you solve YOUR problems, too!

Write for sample and quotations—or order 5 gallons at drum price.

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2641 W. Grand Ave., Chicago 12

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Let us help with
your finishing problems
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PAINT STRIPPER
A New Development for Industrial Paint Stripping
- Non Inflammable
- Used Cold
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- Works Rapidly on All Types of Finishes
- Will Not React or Affect Any Metal, Ferrous or Non-Ferrous
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1059 East 76th Street
Chicago 19, Illinois

belief was obviously wrong for the simple reason that if the primer had poor adhesion it would come off with fair uniformity all over the surface.

A telegram was sent to the lacquer manufacturer. Soon a service man from the company appeared. When he completed his investigation he found that the metal was not thoroughly cleaned. The lacquer primer lifted off those areas which were contaminated with a residue of oil.

Similar experiences have occurred in many other plants to my knowledge. If the paint foreman could only realize the importance of proper metal cleaning, there would be less paint failures and less blame placed on paint companies' materials.

In some instances other forms of residue are left on the metal. As a result there may be lack of adhesion or discolorations in the finish coating. If soldering acid has been used on the metal surfaces this acid should be neutralized before any priming is started. The best time to neutralize soldering acid is immediately after the soldering is done, before the acid has a chance to dry. Then it can be wiped out of the pores of the metal.

The rust preventatives that are used on some metal products are a source of trouble—unless all traces of them are completely removed before priming begins. All in all, if the metal cleaning is thoroughly and completely done, there will be very little trouble with paint adhesion.—Cohagan.

Prevention of Mildew on Leather

A fungicidal dressing for the treatment of leather goods, developed by the National Bureau of Standards, provides complete protection of such goods from mildew. Information about the composition and use of this fungicidal dressing is revealed in Technical Report 1218, which may be obtained from the National Bureau of Standards, Washington, D. C.

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Color Card Has Light Reflectance Readings

Light reflectance readings for each color shown is a feature of the new color card issued for Johnson's Wax-Fortified Interior Finish. Copies are available from local distributors or directly from S. C. Johnson & Son, Inc., Racine, Wisc.

Light reflectance readings indicate the actual percentage of light reflected by each of 34 colors and tints. Thus, a moment's study indicates how much more of the available light is reflected by white, for example, than by dark grey or any of the other colors shown.

Wrinkle Finishes on Products

Many examples of products coated with wrinkle finish are shown in the No. 2; Vol. VIII issue of "New Wrinkles in Finishing", an 8-page illustrated magazine, published by New Wrinkle, Inc., 137 N. Perry St., Dayton 2, Ohio. Copies of the magazine are free.

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Profits from Inventories

"How to Get Profits from Inventories" is both the title and the content of a new 24-page illustrated booklet published by the Systems Division of Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y. The booklet quickly gets to the heart of this timely question of profitable inventory control. It pictures and describes the most modern methods of simplifying the management of stocks to prevent losses either from too much or too little. It shows why and how improved, modern inventory records reduce clerical costs and conserve executive time.

Strippable Spray Coatings

Wartime American research on the development of strippable spray coatings, such as are used to cover airplanes and other military equipment for storage purposes is described in three reports now on sale by the Office of Technical Services, Department of Commerce. The research was carried out in 1944 and 1945 at the Parlin Laboratory, E. I. DuPont de Nemours & Co., Inc. under a contract with the U. S. Navy Department.

The purpose of the research was to develop a strippable coating resistant to corrosion, fungus, insect, and rodent attack, easy to apply by unskilled personnel, safe to use on metal and wood surfaces, and easily stripped off by hand.

Free Book on How to Select Industrial Processing Ovens

A new "planning guide for production people concerned with heating, baking or curing problems," is announced by Gehnrich & Gehnrich, Inc., 3232 57th St., Woodside, L. I., N. Y., under the title of "How to Select the Right Oven for Your Process."

The manual discusses: the four basically different types of oven heating sys-

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tems; when to use which; the different heating media; temperature and safety control; insulation; the material-handling problem; interesting ingenuities; the action of different products under heat (chemically, physically, metallurgically, structurally); and the seven basic oven and heater types.

Liberally illustrated, the 32-page two-color book includes: 43 drawings and diagrams, 23 photographs, 7 oven-selection tables, and numerous important definitions and listings.

Egyptian Lacquer Booklet on Clear Finishes for Metal

The Egyptian Lacquer Mfg. Co., Jacobus Ave., South Kearny, N. J., has prepared a booklet entitled, "Is There a Better Metal Finish Than the One You Now Use?", for free distribution to industrial consumers of clear material for metal.

This booklet describes six highly developed metal clears and their usage. Not all of them are new formulas, since the selection was made according to specialized usage. Both synthetic and lacquer types are listed. The booklet is of particular interest to manufacturers of products fabricated from brass, bronze, copper and silver.

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